

SPATIAL LOGIC IN
PRE-HISPANIC MESOAMERICA

by

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A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

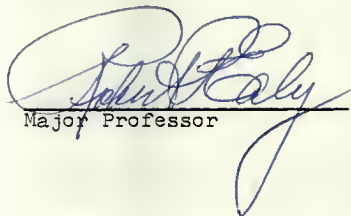
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Notes: * B.B.R. stands for the Bureau of Business
at the University of Texas at Austin.

** I.N.A.H. stands for the Instituto Nacional
de Anthropologia e Historia.

P R E F A C E

Some years ago, as a boy, I remember standing before a glass case located in a museum at a major archeological site in the American Southwest. In this case several unidentified artifacts had been placed, and speculation was welcomed. I studied each piece carefully and at length wondered if one article might not have been used in making pottery. But was it really? Whom could I ask? The archeologists had themselves placed these artifacts in the case because they didn't know their use. It struck me then. Why not ask a potter.....?

I N T R O D U C T I O N

PURPOSE

Like the potter, the designers of physical space may have empirical insights to offer to the archeologists. The word "empirical" is used because many of the most useful theories upon which modern design is built are beyond proof.. They are none-the-less exceedingly useful in the pragmatic business of environmental design. This is necessary because the designer must make decisions that affect all aspects of a complex problem with many variables, not just an isolated aspect for which he has proof. We wish it were otherwise, but it cannot be so. We not only are called on to make such decisions, but to do so for a dynamic problem, within a time limit, and within a limited budget. In this, ancient designers and contemporary designers must be assumed to be the same.

Archeologists currently make limited use of such physical designers as architects and landscape architects; however, I would like to begin to work toward a greater contribution by designers if possible. This thesis is intended to act as a vehicle toward that end. Specifically, I have attempted to do the following:

1. To suggest, and to provide examples of one more set of criteria for the analysis of archeological sites based on the "nothingness" between buildings rather than on the buildings and artifacts themselves.
2. To begin to make a case for the use of environmental designers as investigative consultants to archeologists in those aspects which they normally manipulate.
3. To begin to educate myself in the techniques, knowledge, and vocabulary of the archeologist.

4. To begin to educate myself in one archeological zone (Mesoamerica).

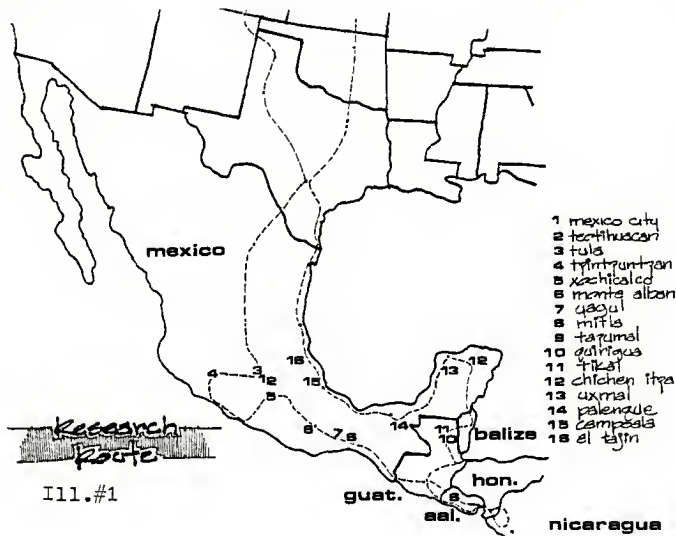
5. To further the commonwealth of knowledge in landscape architecture, particularly in the historic lessons in spatial design offered by Pre-Columbian Mesoamerica which our European tradition has caused many of us to overlook.

6. To introduce the archeologist to some of the techniques used by contemporary designers.

SCOPE

Action

Literary research, therefore, had to include general introductory works in archeology, the general history and culture of prehispanic Mesoamerica, and specific sites in Mesoamerica. Following this literary research, it was necessary to visit Central America. This seemed essential since if one is to search for sensory logic, he must first sense the site directly. In addition, it was important to gain a first-hand knowledge of the site context for each of the ruins that were studied. The ten thousand mile route and site locations are shown in illustration #1.



Ill.#1

Field notes and five hundred slides were obtained. Site literature was accumulated. Note that the first stop was at the Mexican National Museum of Anthropology in order to route and understand the sites more fully.

Product

The resulting thesis omits a general background of archeology as too lengthy for this work, and treats the background of prehispanic Mesoamerica in a very cursory way. For greater insight you are referred to the bibliography. A brief background to contemporary theories is similarly provided with references to more complete works being listed. Six sites have been selected for analysis and presentation, although some sixteen were visited.

Except for the northern zone, one site was chosen from each of the archeological zones utilized by the Mexican National Museum plus Xochicalco, a "mystery" site.



Method

Each of the six sites received the same schematic analysis where possible. Real conclusions from such a limited sampling are necessarily limited. The thrust of the work was directed at initiating the development of a method of archeological comparisons; however, a much more comprehensive study would be required to be conclusive.

Acknowledgements

I wish to thank Professors Robert Ealy, Alden Krider, and Dennis Day of Kansas State University for their encouragement, flexibility, review, and contributions to this work and my general professional growth. My appreciation also goes to Doctor Ignacio Bernal and the staff at the Mexican National Museum of Anthropology for the special accommodations extended to me during my research. The writings of Doctor Bernal, Roman Pina-Chan, and Michael Coe are fundamental to beginning study in Mesoamerica.

1

pre-hispanic mesoamerica

Chapter 1

PREHISPANIC MESOAMERICA

General

Prehispanic Mesoamerica covered an area which now comprises most of Mexico, Guatamala, Belize, El Salvador, Honduras, and Nicaragua (Ill.#3). It is an area of diverse character and potential where climate and patterns of migration and settlement were more strongly affected by topography (altitude difference) than any other single factor.

Geography

Maps of major landforms (Ill.#4), soils (Ill.#5), vegetation (Ill.#6), and current agriculture (Ill.#7) have been provided. Special notice should be given to the great desert in northern Mexico that limited prehispanic movement, settlement, and cultural growth. Those regions containing extensive lakes and rivers were the exact opposite. The Sierra Occidental, Sierra Oriental, and the Chiapas mountains were much cooler and extended into Guatamala. Very little of Mexico could be, or is yet, farmed. Most of the remaining Central American countries are mountainous and remain quite remote except for the narrow coastal plains. Volcanoes were, and still are, very active giving rise to part of their ancient religion. Some sites such as Copilco were covered by lava.

Climate

The climate maps provided (Ill.#8,9,10) are self explanatory. It is, however, reasonable to summarize by saying that temperatures range from hot to mild, but extreme cold is unknown to this area. Humidity and precipitation vary widely so that true desert and deep jungle are both present.

History

It is generally believed that man drifted from Asia across the Bering Straits in successive waves of migration following separate routes and at different times. Evidence now

BASINS AND VALLEYS

- 1 MEXICO
- 2 MORELOS
- 3 PUEBLA
- 4 TOLUCA
- 5 BAJIO
- 6 JALISCO
- 7 BARRANCA DE COBRE



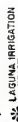
DAMS AND RESERVOIRS



SINK HOLES



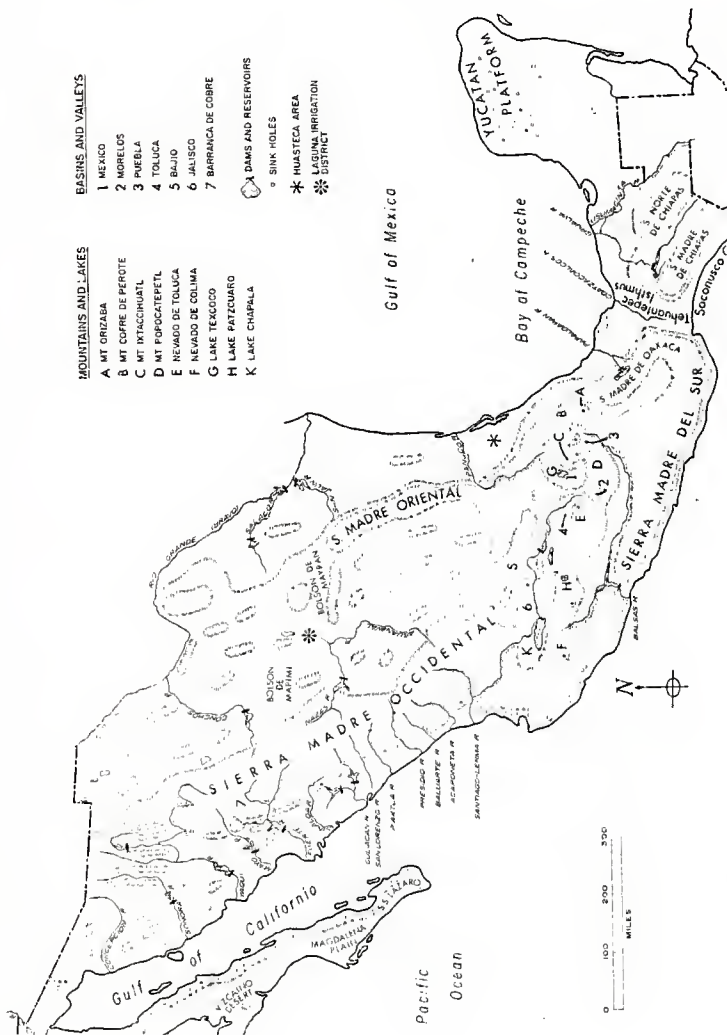
HUAISTECA AREA



IRRIGATION DISTRICTS

MOUNTAINS AND LAKES

- A MT ORIZABA
- B MT CUPE DE PEROTE
- C MT INTACICUATL
- D MT POPocatepetl
- E NEVADO DE TOLUCA
- F NEVADO DE COLIMA
- G LANE TEXCOCO
- H LANE PATZCUARO
- K LANE CHAPALA

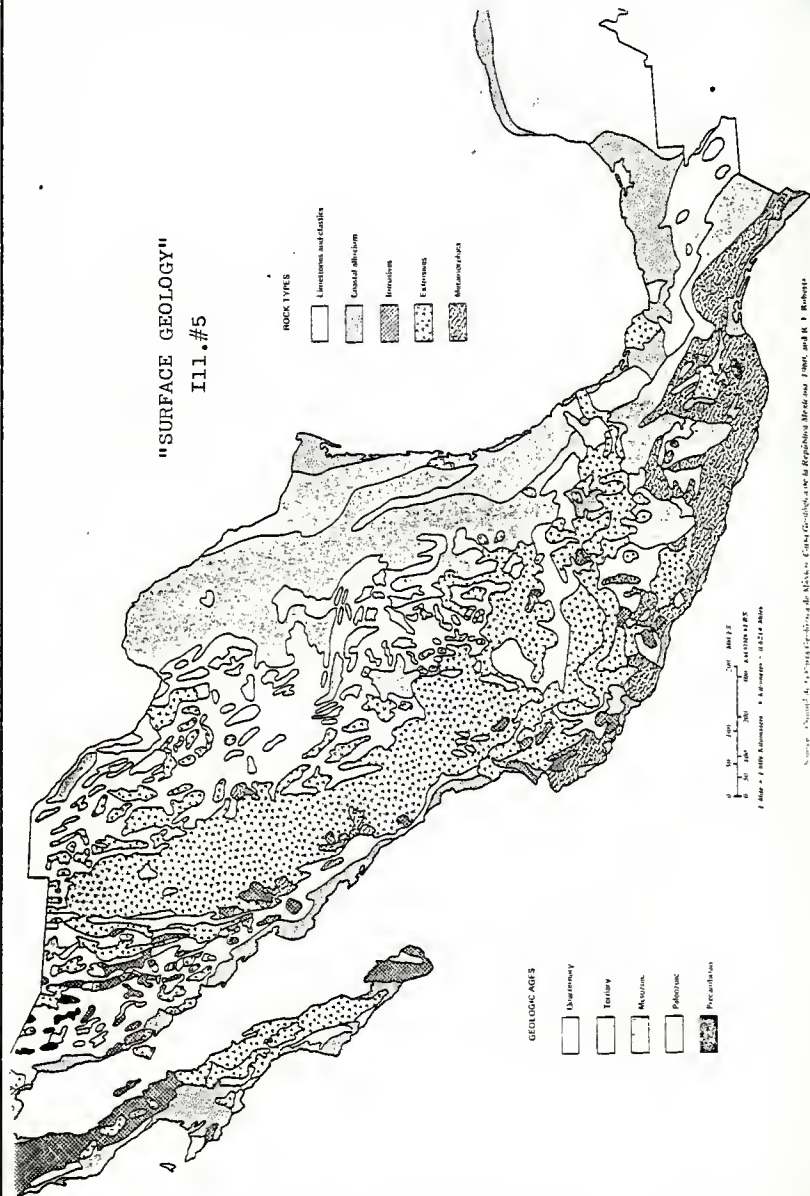


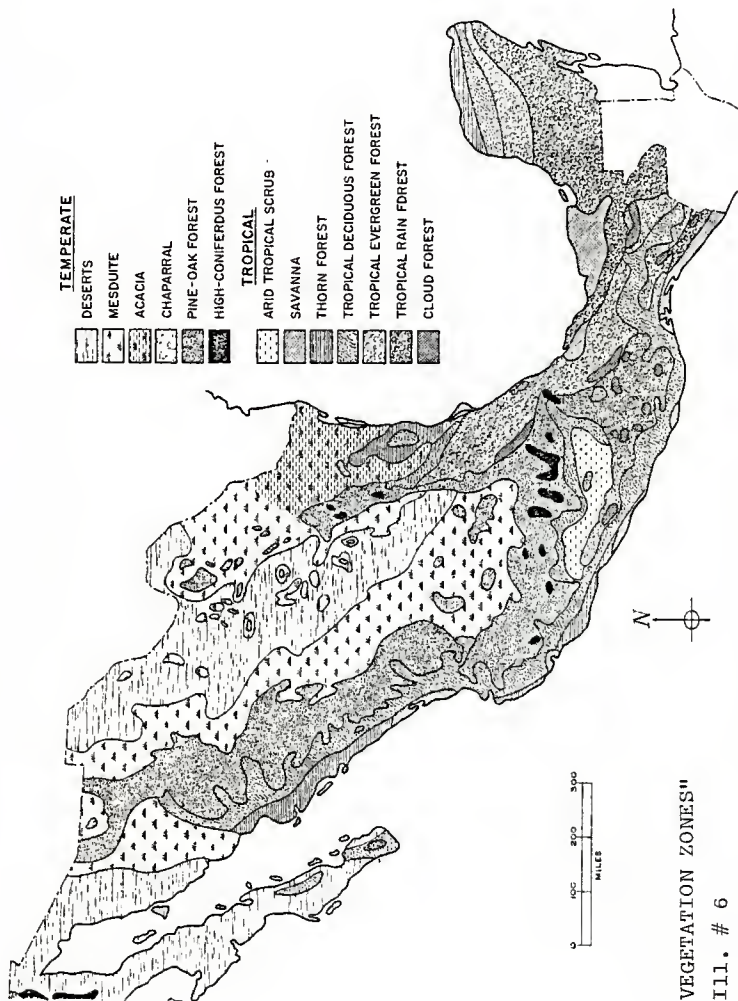
"MAJOR LANDFORMS"

Ill. # 4

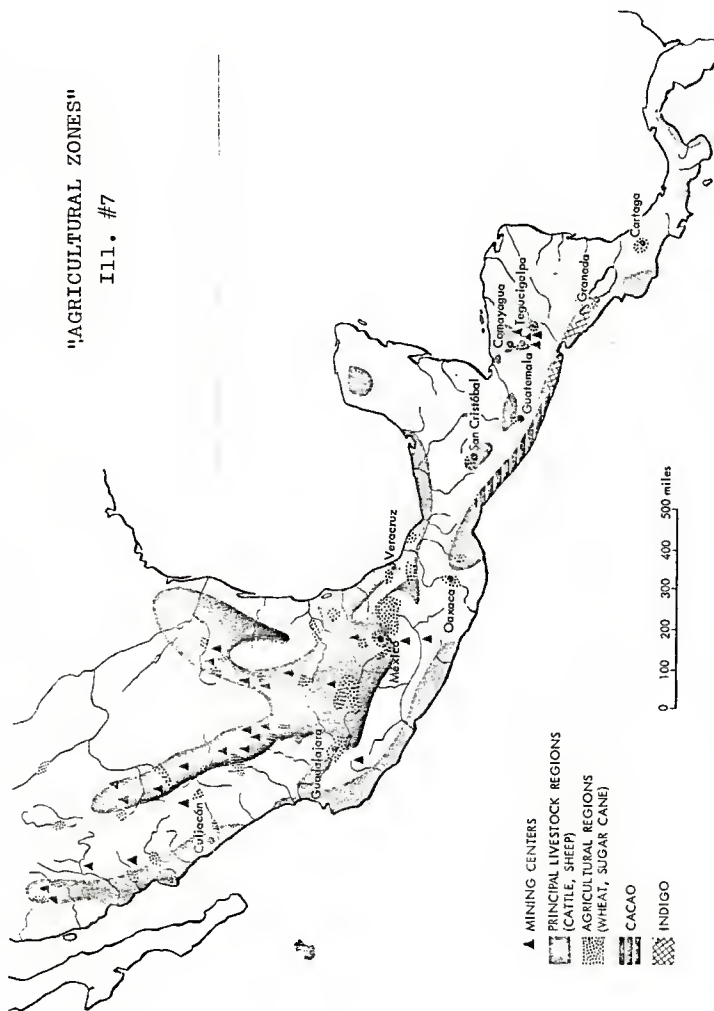
"SURFACE GEOLOGY"

III.#5



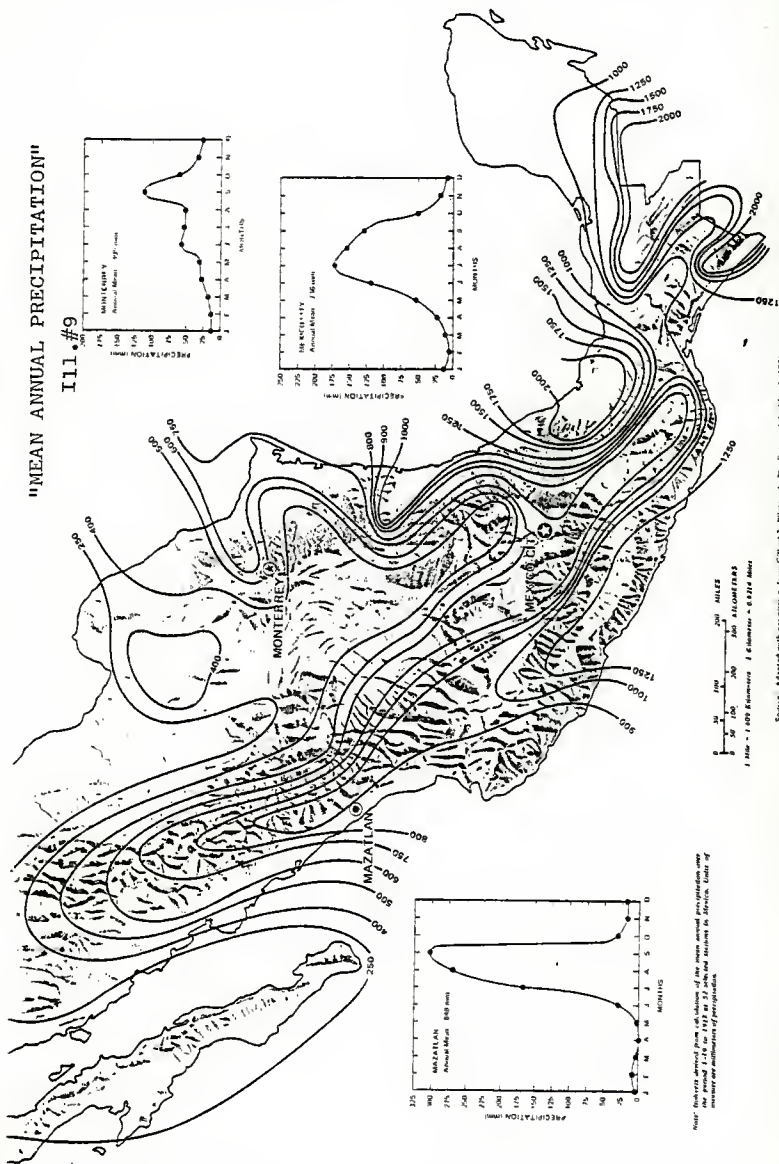


"AGRICULTURAL ZONES"
 Ill. #7



"MEAN ANNUAL PRECIPITATION"

III. #9



substantiates that man was present in Mesoamerica about 10,000 B.C. These early men may be divided into two groups, the brave hunters and the scroungers. At first they occupied caves and later built rude huts. They could weave baskets. Late in this period they began to domesticate crops. Death offerings indicate that they had shamens and a belief in life after death. There was little permanence in a location during this period.¹

The Archaic Period (5200 B.C. to 1500 B.C.) saw the domestication of maize, beans squash, pumpkins, tomatoes, avocados, gourds, and sunflower seeds. It was a diet not unlike that of today's Mexico. Woven baskets gave way to pottery at about 2400 B.C. Dogs and turkeys were domesticated, and family size settlements began along the edges of rivers and lakes. Full time agriculture came into existence by 1500 B.C. resulting in a larger, more concentrated population. It also made way for early occupational specialization such as pottery and weaving. Shamen-priests gained a stronger position in this agricultural society.²

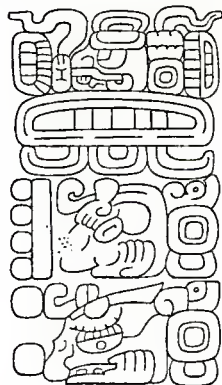
The Formative Period (1500 B.C. to 250 A.D.) began with a wetter climate and larger grain yields. The foundations of the Classic Period are established during this time. However, an important factor to remember is that cultural development in Mesoamerica was far from homogeneous. At La Venta (Ill.#11) the mysterious "Rubber People" (Olmecs) were far ahead of their counterparts, while various "Chichimecs" didn't alter their life styles substantially until far into the Militaristic Period.

Two different farming styles caused varied patterns of urbanization. Basically the lowland peoples practiced slash and burn (milpa) techniques, while the highland peoples began terracing and irrigation. The milpa practice required movement every two to seven years. Therefore, larger true cities such as Teotihuacan were possible in the Altiplano near Mexico City due to this more stable population base, but were not possible elsewhere with the exception of Tikal. Military dominance also

emerged earlier in the "Altiplano", or high central plains of Mexico. Such cities included Teotihuacan, Tula, and Tenochtitlan. Early villages sprung up in Chiapa di Corzo in Chiapas and Kaminaljuyu in Guatemala. Early temple mounds at La Benta and Kaminaljuyu offer proof that political power was already centralized by the emerging priest class.

The economic and social level remained relatively unsophisticated until the Classic Period except at La Venta, which flourished from about 1000 B.C. to 600 B.C. This civilization had a mysterious mongoloid or negroid character of an unknown origin. They developed the famous ball game (pelota) which later spread across Central America. It is a game somewhat like our basketball and soccer combined. The La Venta people also had a calendar and raised earthen pyramids in an arrangement to become common in Mesoamerica.³

The Classic Period (250 A.D. to 950 A.D.) saw the rise of powerful, priest controlled, true cities such as Teotihuacan whose economic "empire" reached even to Kaminaljuyu. Substantial architectural feats were executed. It was a time of city states. El Tajin, Monte Alban, and Xochicalco were three such cities. Goldsmithing, obsidian carving, and other arts flourished. Writing on paper, record keeping, and the corbeled arch were developed by the Maya. Their writing was ideographic rather than phonetic (Ill.#12).



Toward the end of this period the military class began to gain control, and at about 900 A.D. a general upheaval took place throughout Mesoamerica. This was a time of abandonment, migrations, and fortified strong points. The cause is not yet known. Current theories include a change in climate, excessive population growth, or a rebellion against government excesses to name only the most common.⁴

The Militaristic or Post Classic Period (950 A.D. to 1519 A.D.) is much better known to us. Using the few remaining pictographic histories (codexes) we can not only trace events, but even important individuals. The Toltecs of Tula, Mixtecs of Monte Alban, and the Aztecs of Tenochtitlan dominated this period. Waves of "Chichimecs" or barbarian nomads like the Aztecs swept successively into the Altiplano, each conquering the former, resulting in cultural overlays.

Without a doubt, the most important man of the era was Ce Acatl Topilzin Quetzalcoatl (987 A.D.) also known as Kukulcan by the Maya. So important is he that even a brief outline such as this demands more explanation of his life. This priest-king of the Toltecs was born to a mother, who by legend, could catch arrows with her hands. Most writers agree that his royal father, a Chichimec of unknown origin, came to Tula (900 A.D.) by way of Teotihuacan after the fall of that great city. Following the treacherous murder of his father by an uncle, Ce Acatl was whisked off to Tepetzlan to the home of his grandparents. Later he apparently received his education as a priest at Xochicalco and was given the name of Quetzalcoatl, the god he served at the time. He then returned to Tula to slay his uncle and establish a peaceful and enlightened rule with the support of the "Nonoalcas". The Nonoalca origin is also shrouded in mystery, but some suggest that they were survivors of the destroyed city of Teotihuacan. An internal struggle over Ce Acatl's disapproval of human sacrifice led to his downfall and he was forced to depart with his followers. Legends vary but the coincidental

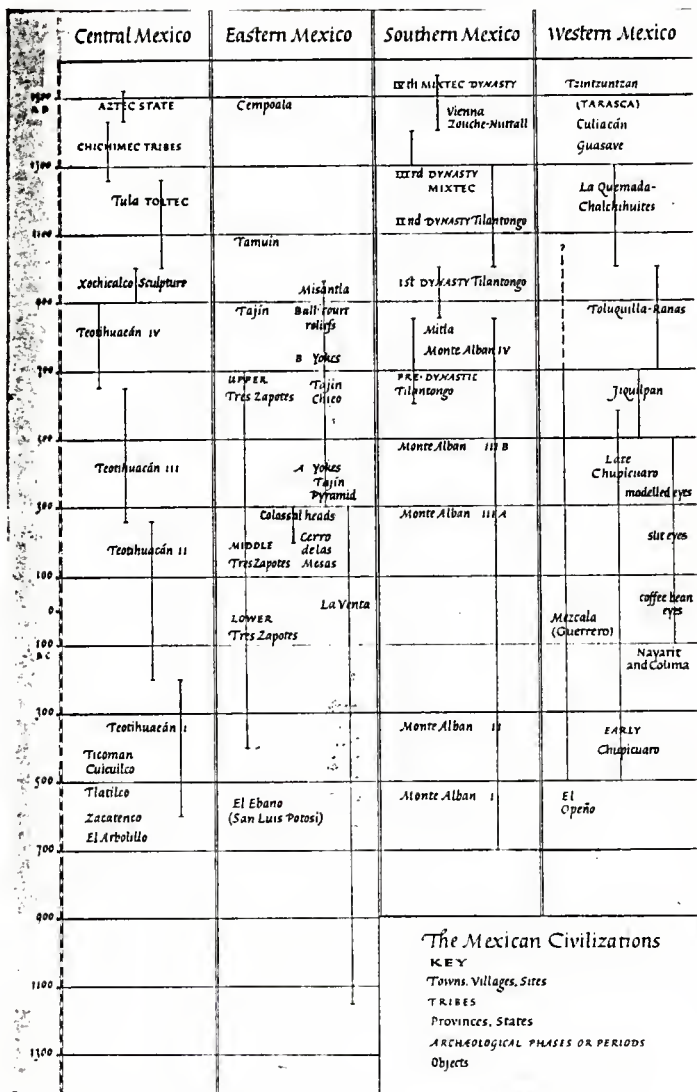
arrival of Kukulkan, and the striking similarity of Tula and Chichen-Itza leads most authors to accept Yucatan as his final destination where he is believed to have built "new" Chichen-Itza.

A subsequent wave of Uto-Aztecan Chichimecs drifted into the Valley of Mexico following the fall of Tula (12th Cen. A.D.) This weak nomadic tribe found a little wanted place at the edge of Lake Texcoco where they lived by the grace of their more powerful neighbors. By forming a triple alliance with Texcoco and Tlacopan they were able to establish a huge military empire prior to the arrival of the Spanish in 1519. The fall of the Aztecs to less than 1000 Spanish is well known to every Mexican school child. The Aztec chieftain, Moctezuma II, was unable to cope with the prophecy that Quetzalcoatl would return from the east on the anniversary of his birth. Cortez, by coincidence, arrived at that exact time, from the right direction, with astonishing weapons. Tenochtitlan was conquered in 1521. Illustrations #13 and #14 should be helpful in ordering these events. 5.

Culture

Much of what we know of Mesoamerican culture comes to us from written histories present at the time of the Spanish conquest and from their direct observations. This means that the following description, adapted primarily from Frederick Peterson's fine book entitled "Ancient Mexico", is from Aztec and late Mayan culture. As the Aztecs were wandering barbarians prior to entering the Valley of Mexico, there is historical precedent for believing that they embraced the culture of those they conquered. Our understanding would be greater if Catholic priests had not systematically destroyed most of the indian codexes, or histories.

Education. Education began in the home with the mother teaching the daughters, and fathers teaching sons their repective duties. Punishment was severe. From the age of six to twelve



"MEXICAN CIVILIZATIONS CHRONOLOGICAL CHART"

the boy received his formal education at either a clan school or the Calmccac. Royalty usually went to the latter which held about one hundred boys. At the clan school a boy slept, studied war, religious duties, and returned home to eat and study his father's vocation each day. At the Calmecac the boy saw little of his parents and studied math, architecture, astronomy, justice, and the like. Schools were never coeducational. Girls studied at a separate school conducted by priestesses. Isolation and discipline were severe, and they left only to become wives. Generally, women didn't play a strong role in politics.

Social and political organization. From family rule the Mesoamericans evolved to clan rule, then elected a central leader. This electorate narrowed to an electing council, and finally deteriorated to hereditary rule. The ruler was surrounded by a council, all of whom enjoyed a lifetime tenure. Below these was a tribal council which had four officials: a military leader, a civil leader, a judicial leader, and an intermediary between them. This council primarily settled clan disputes. Below these were clan councils whose leaders were elected and controlled tax collections, police, work bosses, and justice. A class system existed with priests and nobility at the top; commoners, bondsman, and transporters were below. Slaves were also used. Social mobility by deeds and marriage existed. Blood lines from Teotihuacan to the Aztecs were preserved by political marriages. The nobility was divided into civil leaders, feudal landowners, free farmers, and sons of nobles. Land was owned by either the ruler or the clan and was given or removed at will. Class separations gave political control and stabilized the social structure. The empire and the city were divided into quarters, each with its own clans. City states ruled provincial areas, collected tribute, and administered justice. The Maya were always less centrally controlled and had two military leaders. One possessed a lifetime appointment, the other served for three years. Their culture was in

substantial disorder by the time the Spanish arrived.

Justice. Judgements in Mesoamerica were generally quick, fair, and earned severe punishments. Judges were well selected from the best society and sufficiently paid to place them above bribes. Civil crimes were heard within one or two days in clan courts. Sentencing could be deferred to the next higher court. For the Aztecs the tribal court was a tribunal. Each provincial city-state had one which heard appeals and cases involving more serious crimes. The highest court was second only to the ruler and their decisions were final. They heard cases of the nobility and those affecting the state in addition to appeals. The ruler sat court every ten to twelve days with a council of thirteen. The Aztecs had one unusual distinction. The "court of eighty days" demanded the presence of all judges great and small. They presented their work for the last eighty days, and particularly difficult cases were decided here. No case ever extended beyond this eighty day period. No lawyers were used. Perjury was unknown due to religious fear, and laws drawn by the ruler and councils were not unlike our own. Rape, murder, assault, land disputes, indebtedness, treason, military cowardice, and the like were subjected to coded law. The military and the market had their own courts. Punishments were severe ranging from death by strangulation, stoning, or burning to more mild punishments such as head shaving and public admonishment. There was equality before the law, but nobility was more severely punished. A second offence brought double punishment, and the third offense brought death.

Religion. Perhaps the most important aspect of Mesoamerican life was their religion as it permeated every aspect of their existence. Government was theocratic, and their religion completely polytheistic. Conquerors habitually absorbed the vanquished peoples gods. A dualism similar to yin and yang was evolved and reflected in the construction of some temples. The concept is also evident in the form of a unique

athletic contest or ball game. These games were played throughout Mesoamerica with the defeated team being sacrificed. The contest resembled a cross between soccer and basketball using a small hard rubber ball. Belief in multiple heavens and underworlds is apparent. Life after death was assured and its character dictated more by mode of death than by conduct during life. One could confess and be forgiven his sins once in life. There was a hierarchy of priests and priestesses. Recorded codices, or pictographic histories, directed their conduct. Gods were human and could be displeased or bribed. Human sacrifice was practiced in Pre-Classic times, and expanded to mass sacrifice in the Post-Classic Period. Self mutilation and animal sacrifice were also employed. Offerings of any sort were accepted, although each god had its characteristic mode of sacrifice and victim. Each god had his direction, color, dress, and symbols. For example, Quetzalcoatl was bearded, white, and god of the east. All of this became important when Cortez landed at Veracruz. Other common religious practices included the use of narcotics, fasting, and silence for extended periods.

PEOPLES OF MESOAMERICA

Olmec

The "Rubber People" or "Magicians" founded La Venta in about 1000 B.C. Other great cities include Tres Zapotes, and Cerro de las Mesas. They are famous for their huge carved stone heads with negroid or mongoloid features, the "ball game", and the development of a calendar. They may be a severed tribe of Maya experiencing independent development. Their influence stretches to Cholula near Mexico City, to the Totonacs at Monte Alban, and to the Mayas in the south.⁶

Maya

Cities of these people are found in Belize, Guatemala, Chiapas, Yucatan, El Salvador, and Honduras. The ancient cities of Tikal, Kaminaljuyu, Uxmal, and Copan are some of the best

known today. Palenque remained hidden until quite recently. The Maya had little nautical interest as Tulum was the only major Mayan city directly facing the Caribbean. Old Chichen-Itza, established in the seventh century, apparently experienced a Toltec invasion establishing New Chichen-Itza. The Maya developed a sophisticated calendar that differed from that of the central highland. Roman Pina-Chan suggests that the key to remembering this extensive and complex civilization is that following a cultural evolution, similar to that already described, and migrations during the Pre-Classic era, rudimentary ceremonial centers such as Tikal were established from about 800 B.C. They were famed for their exquisite stelae begun between 100 B.C. and 200 A.D. These have provided an historic record in hieroglyphs. This stage of development is often referred to as the "Old Empire" and included Tikal, Uaxactun, Palenque, Yaxchilan, and Bonampak. The "New Empire" centers were in the lowlands and include Chichen-Itza, Uxmal, Kabal, and Mayapan. The Classic Period is divided into two parts: Early Classic (250-600 A.D.) and Late Classic (600 to 900 A.D.). Three regions evolved during the Classic Period. The Central Zone (Tikal, Palenque, Yaxchilan, Uaxactun, and Bonampak) is the earliest, and is noted for its architecture, calendar, astronomy, stucco modeling, and murals. The Southern Zone (Chama, Copan, and Quirigua) had less impressive architecture but more impressive stelae. The Northern or Plains Zone (Chichen-Itza, Uxmal, Kabal, and Mayapan) was last to develop. This represented the culmination of the first two periods, then gave over to a Toltec cultural overlay. Often referred to as the "Greeks" of the New World, they were once thought very peaceful. This notion has since been assailed.⁷

Tarascan

Little is yet known of these and the other western archeological zone peoples such as the Nayarit and the Colima. The Tarascans had their capitol at Tzintzuntzan in the modern state of Michoacan. They are presented as a more free people⁸

who were adversaries of the Aztecs during the Post-Classic or Militaristic Period, although they began in Pre-Classic times.

Totonac

Best known as inhabitants of El Tajin, they later occupied Cempoala with some cultural alterations. They arrived from Northern Puebla around 800 A.D. The crenelated wall at Cempoala and the Pyramid of Niches are important architecturally. The El Volador (high pole flying) is still performed here. They are famous for a characteristic smiling god depicted in ceramics, particularly at Las Remojadas.⁹

Huateca

These people occupied the area north of the Totonac, although they dated back to Pre-Classic times, and were still in existence during the time of the Aztecs. Their statues depict extensive body painting and tatooing. They appear to be a more passive people known for their lax morals. Little is known of their architecture. El Tamuin is their most famous site. There is a linguistic tie to the Maya.¹⁰

Zapotec¹¹

This tribe developed Monte Alban at about the same time as Teotihuacan (200 to 800 A.D.). They were engineers, mathematicians, and astronomers of considerable prowess. Their work shows a clear Olmec influence suggesting cultural contact or migration with that older people. They had a diversified economy and a stratified society. Teotihuacan influence can also be found. Hallucinogenic drugs were used, and a variety of musical instruments and dancing were important in their culture.

Mixtec

The "inhabitants of the clouds" as their name symbolically implies siezed Monte Alban from the Zapotecs, although their origin is uncertain. The Mixtecs were more warlike and are known for their multicolored pottery, goldsmithing, and and the shaping of gems. We know the latter since they utilized

Monte Alban for rich burial offerings. It is believed that they came from northern Oaxaca after a two hundred year Toltec influence (1000 to 1200 A.D.) that increased their knowledge. Their characteristic fretwork adorns the walls of Mitla to the south of Oaxaca.¹²

Teotihuacan

This powerful trading people established their capitol near Mexico City and dominated Mesoamerica until about 850 A.D. when Teotihuacan was burned. Their traders are currently thought to have traveled as far as Kaminaljuyu and Tikal in Guatamala. Ruled by a strong central theocratic government, they erected the most awesome city in prehispanic Mesoamerica.¹³

Tolteca

Following the fall of Teotihuacan the Nonoalca (a group of skilled artists) merged with a Chichimec (barbarian) tribe to form a new empire based at Tula. This society was more militaristic than Teotihuacan. Architectural similarities suggest that following an internal struggle, the vanquished faction retired to Chichen-Itza in Yucatan.¹⁴

Aztecs

This fairly late Chichimec (barbarian) tribe entered the Altiplano area after the fall of the Toltecs, and ruled until the arrival of Cortez in 1519 A.D. We have acceptable records of these people that reveal the culture, which is a composite of earlier societies. We are also able to trace their extensive military campaigns. They are contemporaries of the Tarascans, Mixtecs, and Zapotecs. Unfortunately, their island capitol at Tenochtitlan has been almost completely destroyed by the construction of modern Mexico City. Theirs was a particularly savage society with as many as 20,000 persons being sacrificed in a single day.¹⁵

2

spatial design

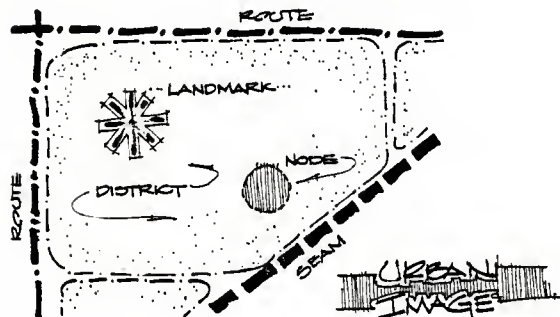
Chapter 2

SPATIAL DESIGNGeneral

The following is a brief introduction to some of the common design theories used by contemporary urban designers. Readers without a design background are advised to read the references cited in order to fully understand them.

Image of the City

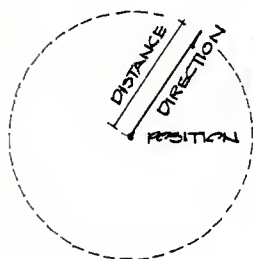
Kevin Lynch¹⁶ has provided designers with many insights, but for the readers who are unfamiliar with his work, the following is intended to summarize his findings concerning the manner in which people understand the physical construct (perception) of their city. By asking strangers to give directions, Lynch found that people consistently used "landmarks" (e.g. the Eiffel Tower), "nodes" (e.g. Times Square), "districts" (e.g. China Town), "routes" (e.g. Main Street), and "seams" (e.g. the Seine River in Paris). The latter behaves as a line or boundary, but is not a route. Far from being proven, the theory is widely used today in urban design circles and was a pioneering piece of useful work on the mental image people have of their city.



Ill. # 15

Existential Space

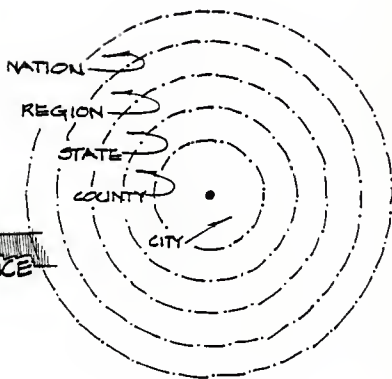
From Norberg-Schultzs' book "Time, Space, and Architecture"¹⁷ the following two viewpoints have been extracted. First, man's physical being as one entity utilizing five senses understands space in terms of "position", "direction", and "distance". For example, in giving directions one might say "(from here) go east for about two miles". His second notion is that we understand our spatial position with respect to a hierarchy of frames of reference. To support this we might take note that a typical address might be: 210 Baker Street, Englewood, Arapahoe County, Colorado, United States of America. While primitive man was undoubtedly very different from us in many ways, his physical being and senses will be assumed to be sufficiently similar to allow use of the theory.



Ill. # 16

~~THE PRIMITIVE~~
UNDERSTANDING

~~HIERARCHY OF~~
FRAMES OF REFERENCE



Ill. # 17

Urban Room

Another widely read work on urban design, "Townscape" by Gordon Cullen¹⁸ introduces an analogy between exterior spaces (such as an urban plaza) and interior rooms. Hence, the street and sidewalks may be thought of as a floor; the openings formed by streets and spaces between buildings are urban windows and doors; and the ceiling is formed by overhangs, tree canopies, and the sky. Urban furniture such as sculpture, fountains, litter receptacles, parking meters, and the like are the embellishment (and sometimes the clutter) found within this urban room. Since history tells us that different people had characteristic floors, walks, windows, ceilings, and furniture in the interior of buildings this theory may offer some use to us in our search for characteristic patterns in the exterior spaces of Mesoamerican cities.

Personal Space

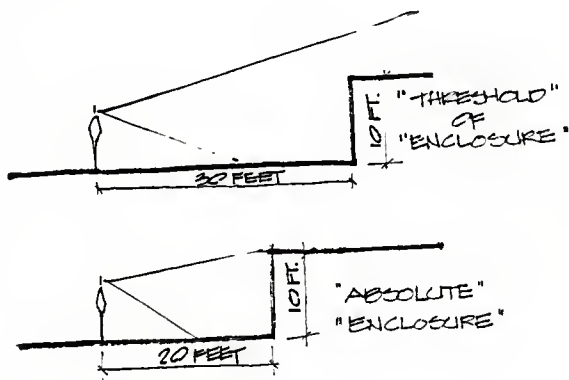
Peter Hall, Robert Sommer,¹⁹ and others have written several books addressing the notion of spatial possession. The following is offered as a brief summary of their thoughts. First, a person has a sense of territorial possession. This doesn't mean just real property described in a deed, but an envelope of space around his body. Thus, one becomes uncomfortable when another violates this space by standing "too close". Similarly, a group possesses a space of a size and shape suitable to it.

A second interesting observation is that there is a hierarchy of privacy associated with the design and use of space ranging from private to semi-private, semi-public, and public. Space, then, is a commodity as deliberately shaped and controlled by a good designer as any sculptor might shape clay.

Degrees of Enclosure

Camillio Sitte²⁰ was one of the early writers to address space as a tangible, designable, valuable commodity. He studied

European plazas at great length, emphasizing "degrees of enclosure" among other subjects. He announced that the threshold of enclosure was generated by a wall making a one-in-three ratio with the open space it contained (Ill.#18). Absolute enclosure resulted as one experienced a one-in-two wall to open space ratio. He also studied the placement of statues in plazas. This placement had seemed arbitrary to some, but as Sitte began to study routes that people followed in a given plaza, he discovered that they were placed to avoid interrupting probable pedestrian routes across the plazas.



"DEGREES OF ENCLOSURE"

Ill. # 18

Form from Route

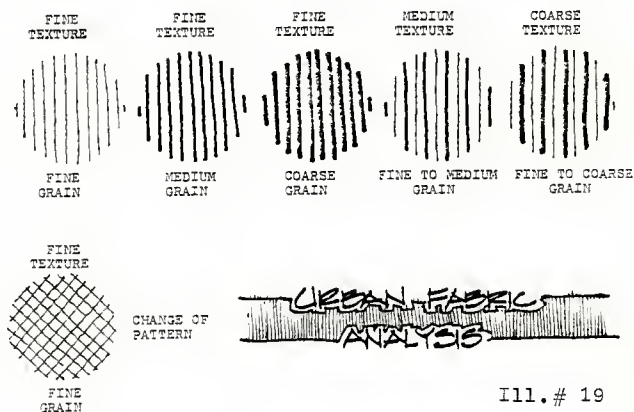
Bacon²¹ extended Sittes observations into a full theory of urban form based on the accommodation of circulation. Using schematic analysis of routes of preference for circulation, he investigated a series of historic sites. By doing so, he was able to unravel a logic in spaces that had escaped us until that time.

In design we normally describe circulation in terms of routes, modes, duration of loads, peak loads, conflicts, and the like. Unfortunately these can only be implied on an archeological site, but we can observe directly the route width, grade,

length, surface treatment, and turn radii if any. Modern designers are also aware that there is a hierarchy of routes just as there are of places. One leaves his driveway, drives down a small street to a collector, then goes on to a major arterial. Contemporary circulation modes coincide with the "river analogy" set forth by John Ormsbee Simonds²² in which little streams feed into larger rivers. This analogy may aid the reader in understanding the concept of a hierarchy of route.

Urban Fabric

Paul D. Spreiregen in "Urban Design: The Architecture of Cities"²³ draws yet another analogy that becomes more apparent following the development of aerial photography. This analogy recognizes the similarity of the "grain", "texture", and "pattern" of cities and that of cloth. "Grain" is like an individual particle of sand on the beach. "Texture" is formed by the relationship of mixed grain sizes, and "pattern" is the order or logic of the organization of the textural distribution. Such items as buildings form the urban grains, and when these grains are aggregated they result in urban texture. Fine grains adjacent to other fine grains form fine texture. Coarse grains adjacent to other coarse grains also form fine texture. But



fine grains placed with coarse grains form a heavy or coarse texture. If this texture possesses some underlying order (e.g. a grid layout) it is called an urban pattern. While not as individual as finger prints, they are far from being random. Therefore they may offer one more archeological criteria for use in identifying an ancient society by remaining evidence. It must be mentioned that texture is as much a function of the spaces between buildings as it is of the grain of the buildings.

Isovists

Cliff Tandy, in the "Urban Landscape Handbook", invites our attention to view study.²⁴ We have all enjoyed a pleasant view at one time or another; and modern designers are very interested in the development, exploitation, and control of views. While history tells us that some societies have been more aware of the "vista" than others, a competent designer should be able to empirically recognize such exploitations and control if archaeological remains are sufficiently complete. In fairness one must recognize that the site strongly limits the view exploitations that are possible. However, we can go so far as to say that views have characteristics that can be catagorized. Views have extent (or size) in four dimensions, enframement, and often have a focus (or focal point). They may be arranged in a meaningful sequence in varying degrees.

Aesthetics

"The Japanese House" by Heinrich Engel suggests that man evolved a separate aesthetic sense from visually predicting the functional suitability of an artifact.²⁵ For our purposes in this work assume that aesthetics is only a study in perceptual meaning, logic, or order. Just as the behavior of the stock market can be more easily understood when schematically graphed, so is it possible for an experienced designer to develop a schematic drawing which reveals the visual logic or order of a given urban site. Designers use a specialized vocabulary in discussing aesthetics; therefore, a glossary of terms has been included for readers without a design background.

3

methodology

Chapter 3

METHODOLOGYGeneral

Following a brief introduction to each of the several sites, and an outline of its physical characteristics, a series of schematic graphic studies will be evolved. The theories of space previously discussed form the basis for these studies. Sufficient data may not be available to execute all of the studies for every site, but an effort will be made to insure a representative cross section. The applied theories investigated in relation to the several sites are as follows:

1. Urban Fabric: Grain, texture, and pattern will be "hatched".
2. Negative Space Study: Negative spaces or voids will be darkened so that their size, shape, continuity, scale, proportion, and hierarchy will be more apparent.
3. Isovists Study: The extent and quality of views will be schematically analyzed. Focal points and deliberate view enframing will be indicated.
4. Circulation Study: The predicted routes of preference, hierarchy of routes, logic of the circulation system, and probable destinations will be delineated.
5. Urban Room Study: The hierarchy of places, character of walls, ceilings, windows, doors, floor, and urban furniture placement will be evaluated. Where appropriate, the degree of enclosure will be investigated.
6. Existential Space: The positions, directions (or orientations), and distances that seem significant will be displayed.
7. Miscellaneous Observations: Extracts for site visit field notes, and aesthetic logic will be explored.

Note that in many cases it will not be possible to give a precise reason or significance for a given aspect of an urban space, but this does not impair its potential as an archeological identifier. As an analogy, few law enforcers can state the medical origins of fingerprints, but find them quite useful in identification.

4

teotihuacan

Chapter 4

TEOTIHUACANLocation

One of the most extensive, massive, consistent, and powerful ruins existent in the world today rests on the floor of the Valley of Mexico about thirty miles from present day Mexico City.

Site Description

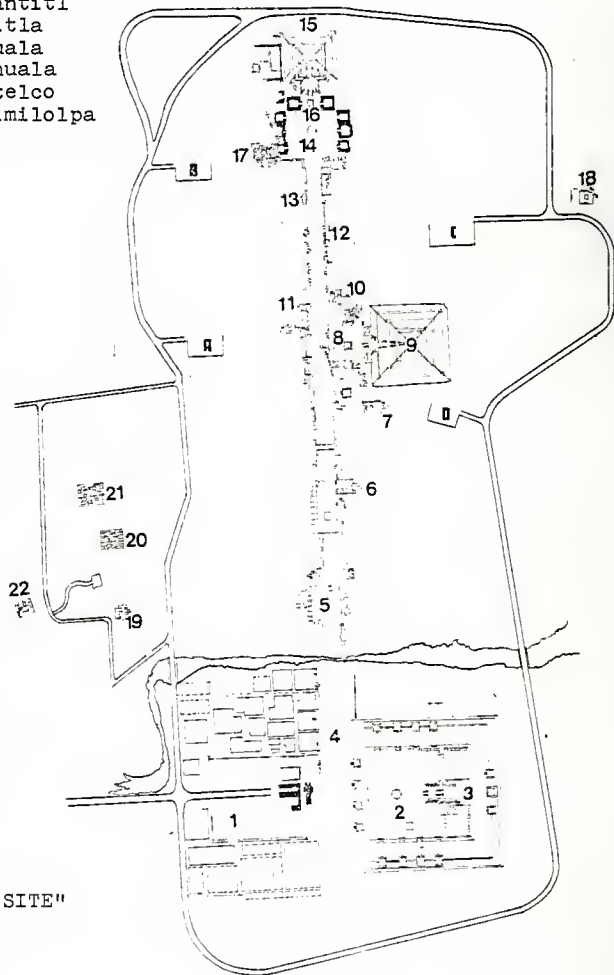
At an elevation of about 2300 meters above sea level, this site occupies an area of about 2200 hectares (5436 acres). The site is central to civilized prehispanic Mesoamerica, though somewhat removed from the lake areas of the central plateau where one might have expected such a city to grow. Its average rainfall is less than twenty-one inches. Shallow bedrock is also present. The San Juan River runs lengthwise down the valley, through the archeological zone and its residential areas. The valley is strongly eroded, somewhat enclosed by low mountains, and slopes slightly from northeast to southwest.²⁶ The soil is exhausted from past agricultural activities, though maize can still be grown. The area outside the zone is under this type of cultivation, or has returned to the hearty volunteering plants common to the high desert. Basically the site is dominated by two large pyramids and a grand avenue which have been reconstructed.

Major Features (see Ill.#20)²⁷

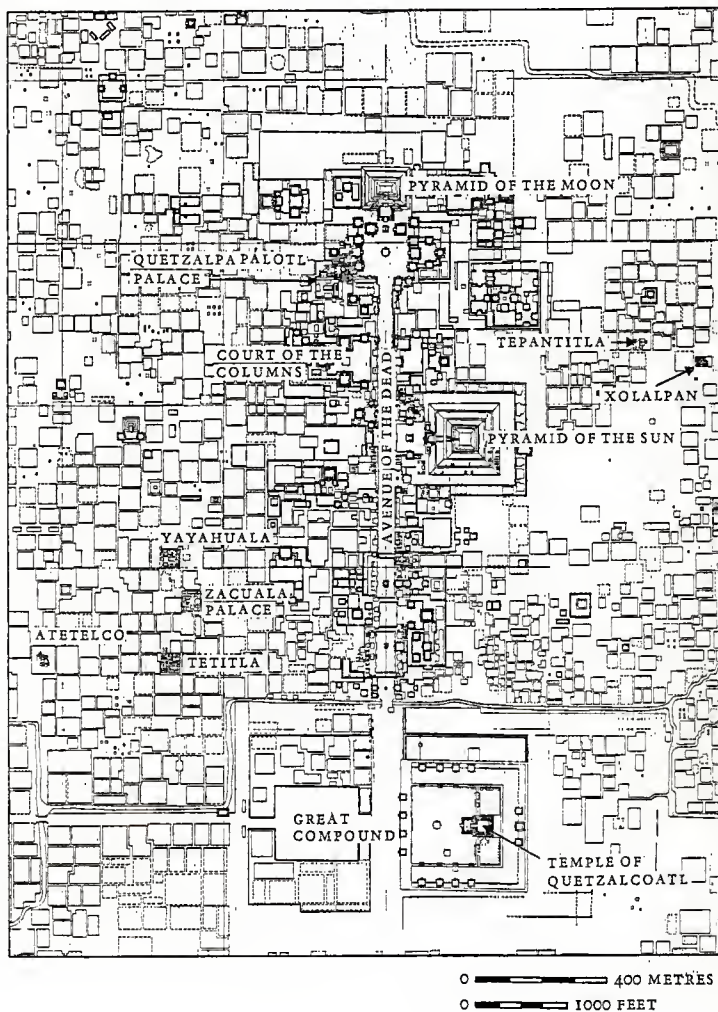
1. Great Compound
2. Citadel
3. Temple of Quetzcoatl
4. Avenue of the Dead
5. Superimposed Building
6. Viking Group
7. Priests House
8. Plaza of the Pyramid of the Sun
9. Pyramid of the Sun
10. Palace of the Sun
11. Patio of Four Little Temples

(Major Features continued)

- 12. Puma Mural
- 13. Temple of Agriculture
- 14. Plaza of the Pyramid of the Moon
- 15. Pyramid of the Moon
- 16. Structure "A"
- 17. Palace of Quetzalpapatl (containing the substructure of the Pyramid of Seashells)
- 18. Tepantitl
- 19. Tetitla
- 20. Zacuala
- 21. Yayhuala
- 22. Atitelco
- 23. Tamimilolpa



"MAP OF RESTORED SITE"
I11.#20



"TEOTIHUACAN PRIOR TO 700 A.D."

ILL. # 21

Chronology²⁸

Illustration #22 shows a graphic chronology of the city. Generally the site flourished prior to, and probably at the expense of, other famous classic cities such as Xochicalco, El Tajin, and Monte Alban.

Date	Teotihuacan Phase	INAH Project Phase	Extent & Population	GENERAL DATE
750	MEXICAN CHOLALAN	Teotihuacan		The abandonment of the City. Destruction of the Ceremonial Center. Highest Quality Materials.
700		IV		
600	XOLALAN	Teotihuacan IIIa		HIGHEST INFLUENCE IN Mesoamerica
500		Teotihuacan III		
400	TAMIL MEXICAN	Teotihuacan IIIa - III	125 000	Plaza of the Moon. Extensive structure of the Pyramid of the Moon. Palace of the Avenue of the Dead. Platform on the Temple of Quetzalcoatl. Mural of the Shalil. Multifamily stone dwellings. Great Compound.
300		Teotihuacan IIa	75 000 Inhabitants	
200		Transition		
100	Mesoamerican	Teotihuacan II		Highest section of the Pyramid of the Sun. Next to highest structure of the Pyramid of the Moon. Temple of Quetzalcoatl. The Citadel. Attached platform on the Pyramid of the Sun.
A.D.	TACUALLI	Teotihuacan Ia	30 Km ²	Pyramid of the Sun, being enlarged to almost reach its actual size. West Avenue; East Avenue. Terraces of the main buildings on the Dead Avenue. Pyramid of the Sun. Pyramid of the Moon.
		Teotihuacan I	30 000 & 25 000 Inhabitants	
B.C.	PALACUILLI	Proto Teotihuacan	6 Km ²	Change from rural life to urban life. Beginnings of the obsidian workshops.
100			10 000 Inhabitants	
150				

"CHRONOLOGY OF TEOTIHUACAN"

Ill. # 22

Proto-Teotihuacan Improved agriculture involving the use of dams and irrigation made specialization possible, which in turn led to urbanization.

Tzacualli Phase The emerging dominance of a priest class initiates a period in which building is the dominant

activity. The regional population began to consolidate within the city.

Miccaotli Phase The influence of Teotihuacan begins to spread by trade across Mesoamerica. Cotton from the Gulf Coast area, Jade from southern Mexico, vermillion from the Maya, orangeware from Cholula, and obsidian from Cerro de las Navajas were all traded.

Tlamimilalpa Phase This period marks the height of the Teotihuacan culture.

Xolalpan Period The zenith of Teotihuacans Mesoamerican influence not only in trade, but also as a tourist and religious center.

Metepec Period A shift to a more militaristic society, and a decline lead to the mysterious fall of the city.

Culture

Teotihuacan's government was theocratic, its society diversified, and the central government powerful. The "Poteca", a class of merchant spies, is noteworthy as they spread Teotihuacan culture across Mesoamerica. Tlaloc and Quetzalcoatl appear to have dominated their elitist religion. Mathematics, survey, and astronomy were all understood by their intellects. Typical art and architecture may be seen in Appendices I and II.

Archeological Efforts

This city was never truly lost, although there existed for many years the erroneous belief that the Toltecs built the city. It is the most widely excavated and restored ruin in Mexico. Major digs include:

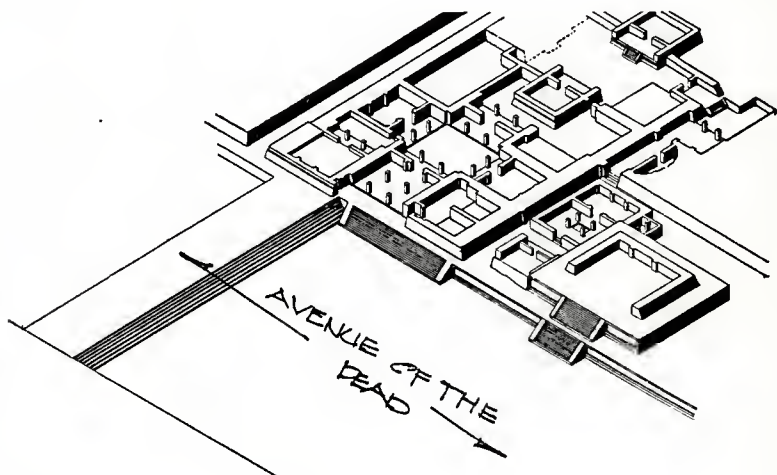
1. 1864 Almaraz
2. 1884-1886 Batres
3. 1885 Charney
4. 1905-1910 Batres
5. 1917-1922 Gamio and Marquima
6. 1972 Instituto Nacional de Antropologia e Historica

Other important authors are Rene Millon, Alfonso Caso, Jorge Acosta, Roman Pina-Chan, and Ignacio Bernal.

Applied Studies

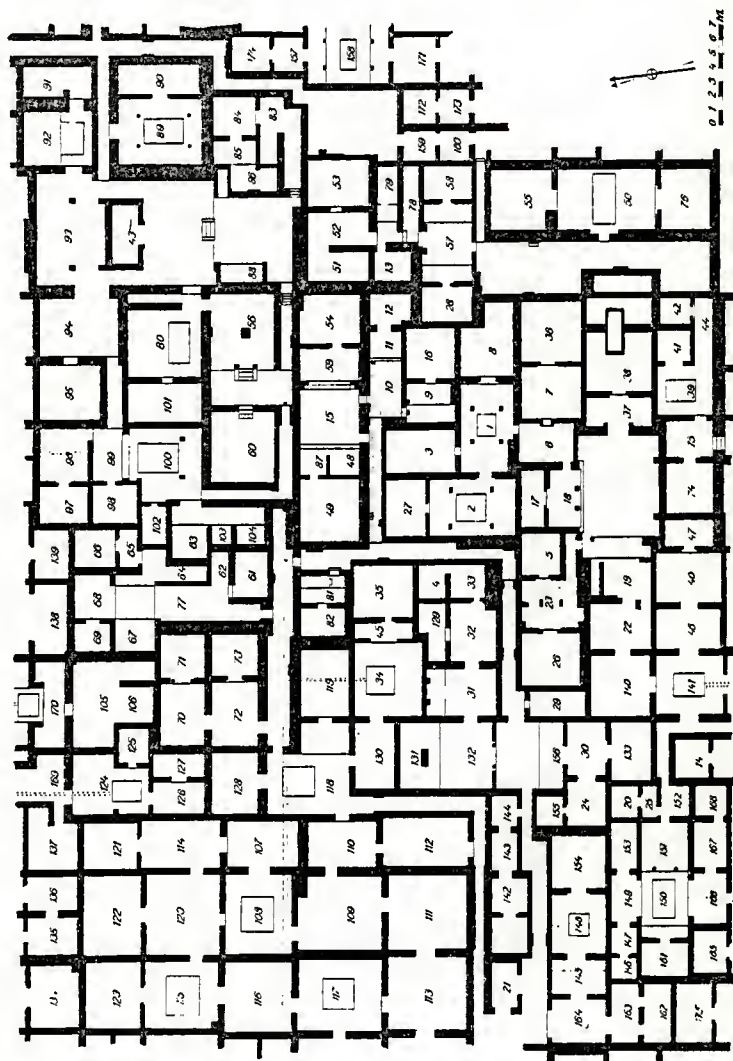
The following are primarily overlays of the basemap of Teotihuacan prior to 700 A.D. (Ill.#21).

Negative Space (see Ill.#25) The largest negative space is the "Citadel" at roughly 900 feet by 900 feet, or an area of about 800,000 square feet; while the most common open spaces range from 30 to 50 meters on a side (1500 square meters). The interior spaces of the Viking Group (Ill.#23) are larger and more axially arranged than at the Tlamimilalpa complex (Ill.#24) which leads researchers to believe the latter is a residential compound for artisans rather than royalty.



"THE VIKING GROUP"

ILL.# 23

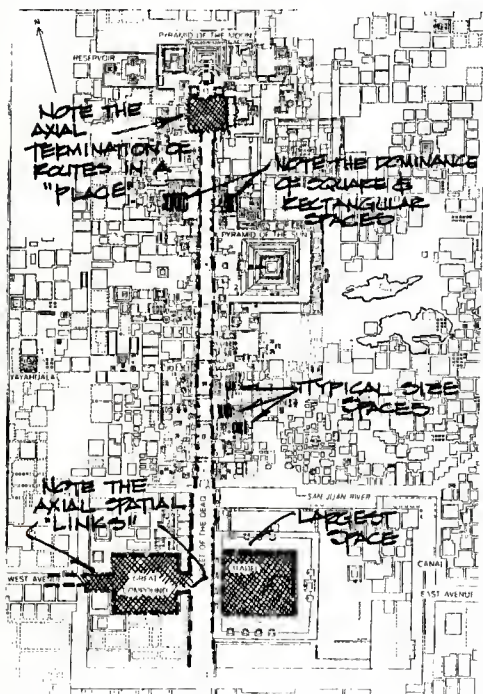


"TLAMIMILOLPA"

I11. # 24

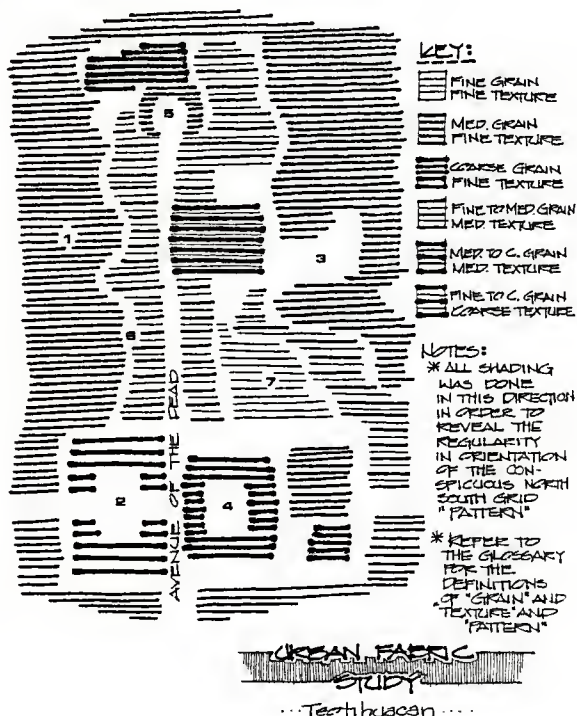
A typical interior semi-public courtyard in that compound is about seven meters on a side.

Rectangular shape, particularly squares, dominate both the positive masses of the architecture and the negative spaces between at Teotihuacan. The proportions of the negative spaces clearly differentiate "routes" (with strong directional qualities) from "places". Places usually terminate, or are axially located at intersections, with respect to routes. The sense of human scale is dwarfed by the size and simple unified power of the city's spaces. Grandeur is the clear intent. Most of the major compounds are distributed along the Avenue of the Dead. A clear effort at spatial linking was done at the Great Compound.



"NEGATIVE SPACE STUDY"

Urban Fabric The largest "grain" size at Teotihuacan is a massive 728 by 728 foot Temple of the Sun. The grain and texture in the quadrants formed by the intersection of the two great avenues of the city are generally fine consisting of medium size grains (buildings) in close proximity. However, at the intersection and terminus of the Avenue of the Dead the texture becomes as coarse as it is likely to become in Mesoamerica (due to the size of the temples). Two aspects, grid and grandeur, are clearly the symbols of strong central control that lasted over almost the total life of the city.

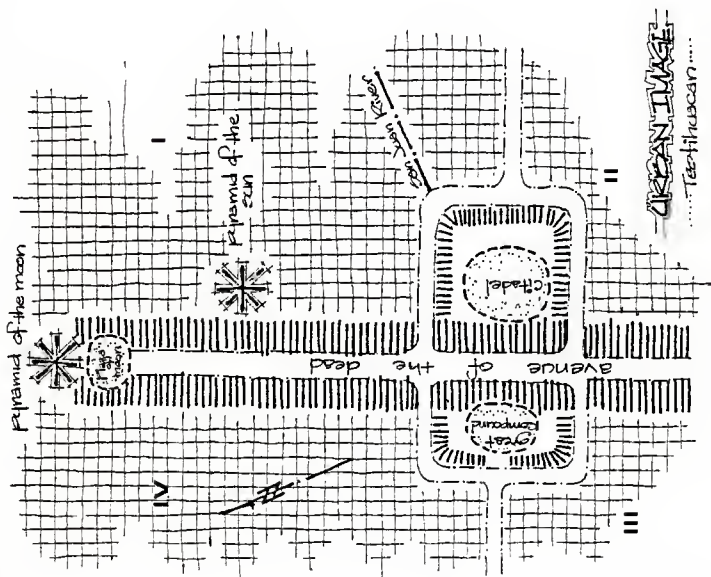


Notice that the basemap has been omitted in this study in order to make the various textures more obvious. The following key has been provided in order to orient the reader by locating prominent features within the schematic drawing.

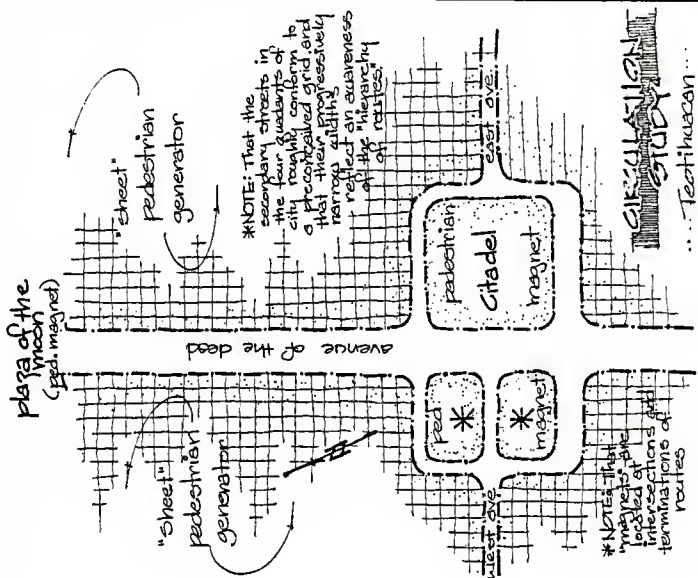
1. Fine texture of the northwest "quadrant"
2. Great Compound
3. Gap in the "fabric" of the northeast "quadrant" (formed by a large reservoir); note that the outline of such a gap often reveals its cause even if all other evidence has been destroyed.
4. The Citadel
5. Plaza of the Pyramid of the Moon
6. A "seam" between two textures (probably caused by a change in land use).
7. Surprisingly fine grains (indicating a residential landuse) in an area that would be either commercial or institutional in most civilizations (since it is adjacent to a major route).

Urban Image The overwhelming landmarks are the Pyramids of the Sun and Moon. These not only dominate the city, but also the vast level plain surrounding it. They are visible for miles. At the intersection of the two avenues rests what must have been the most important nodes (the Great Compound and the Citadel). The Plaza of the Moon was probably second only to these. Lesser nodes interrupt the Avenue of the Dead. The city's fabric is route dominated with the Avenue of the Dead heading the list. One potential seam would probably be formed by the San Juan river as it flowed through the city suburbs. The major avenues acted to form political and physical quadrants, or districts, though the urban texture suggests that areas such as Tlamimilolpa further subdivided these quadrants into districts (see Ill.#27).

Circulation Circulation forms the dominant scheme of this city. The great Avenue of the Dead (Ill. #28) extends four kilometers in length with an average width of 145 feet. It is a size without equal in Mesoamerica, and is cut into the bedrock of the valley floor to a depth of 25 meters at its deepest point in order to allow drainage. A jump directly from such a route to the narrow suburban routes gives this city a surprising lack of hierarchy to a modern designer, but is a reasonable solution

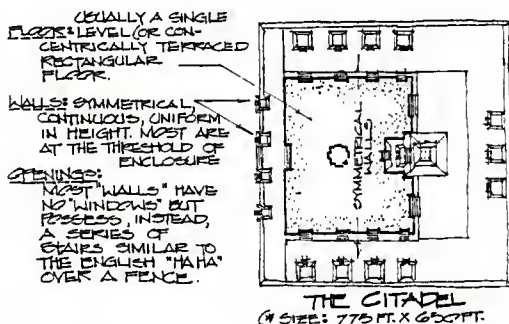
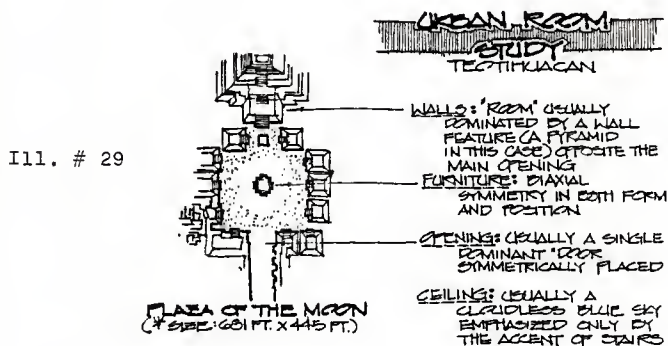


Ill. # 27



Ill. # 28

in a pedestrian culture. This net of feeder routes conforms to the grid established by the primary routes, and seems to have been used to allocate land. Little of leisure routing is evident in this city. Straight, expedient routes exist in every area. One is reminded of Hausmann's Paris or Versailles by this city.



Urban Room Analogy Long continuous urban walls with a level ceiling line enclose the great spaces of Teotihuacan either totally (e.g. the Citadel Il. #30), or are open only at the ends as seen in the Avenue of the Dead. The absence of openings in these walls is a unique feature of Teotihuacan in Meso-america. The floor levels along the Avenue of the Dead are varied as a surprise to the first-time visitor. In these

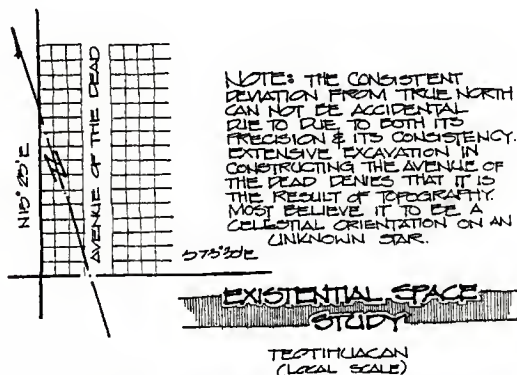
interim courtyards along the route one is completely isolated from the rest of the city, and the "scale jump" as one climbs the stairs from these sunken courtyards (Ill.#35) renders the monotony of the long approach to the Pyramid of the Moon bearable. Furniture (e.g. alters) are centered in the room (see. Ill.#29) probably for both aesthetic and ceremonial reasons.



Ill. # 31

Existential Space The entire city is layed out primarily on a N15° 23' E orientation (Ill.#32). On a regional scale, the city rests at the center of the Mesoamerican world much as China did in ancient Asia. It is little wonder that Teotihuacan (Ill.#31) became a great commercial city, but it is a bit distant

from the lakes of the Altiplano where a city would be expected. For the sake of comparison to other cities, please notice that Teotihuacan is a valley floor city.



NOTE: ALTHOUGH ITS ROOTS STILL REMAIN UNKNOWN, THE MODULE OF 57 METERS APPEARS TO BE THE BASIC MEASURE USED IN LAYING OUT THE CITY AND ITS MAJOR FEATURES.

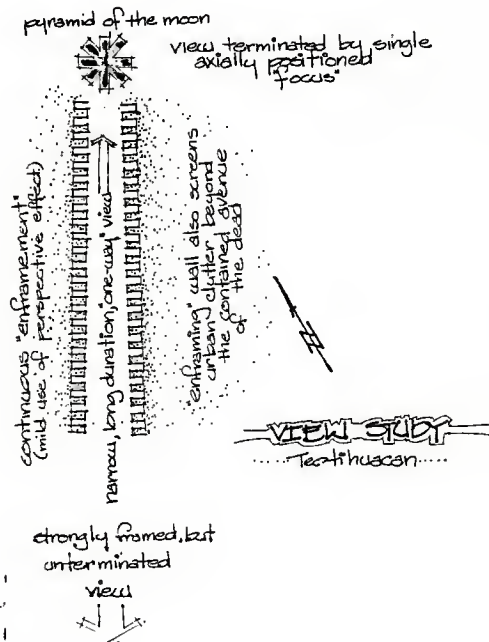
NOTE: TEOTIHUACAN IS POSITIONED ON A VALLEY FLOOR (COMPARE TO THE HILLTOP SITE OF XCHICALCO AND THE HILLSIDE SITE OF PALENQUE)

Ill. # 32

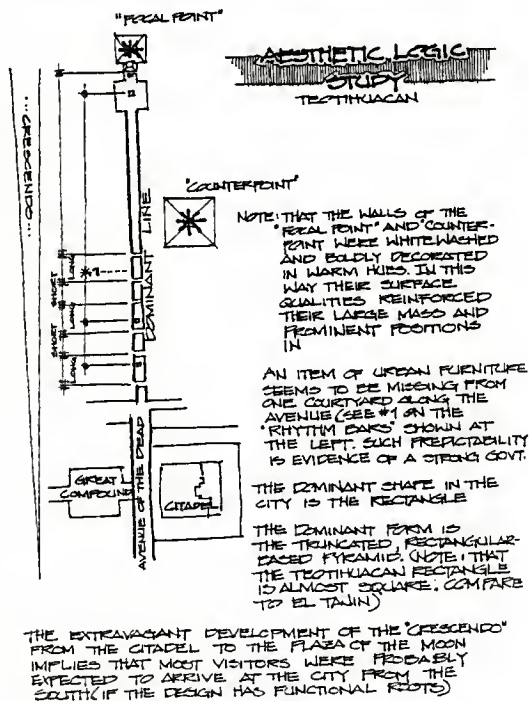
Privacy Study A clear hierarchy of public, to semi-public, to semi-private, to private space exists in the excavated Viking and Tlamimilolpa groups (Ill.#23 and 24). The standards of personal space set by Hall²⁹ probably cannot be directly applied in this time and culture, but if they are, the Great Compound could hold better than 8000 people at a time. The Plaza of the Moon would hold about 1600 persons. According to Hardoy³⁰ the city reached its peak population of 85,000 people during the Xolalpan Phase.

Isovists Study Clearly the inhabitants had an understanding of view use and control as is quite obvious by the

route direction, termination, and enclosure along the Avenue of the Dead (Ill.#33). These enframing walls probably also served as a screen against the residential "clutter" outside the Avenue. In many ways it reminds one of Paris; however, the areas beyond the great avenue are on a grid, not winding in the medieval European manner. Further, planning, rather than destruction seems to be the relationship here in contrast to those cut through Paris. Some destruction of earlier buildings, however, is present. Only two view possibilities seem to have been exhausted in this design: First the long, one-way, highly controlled view previously discussed. Second is the panoramic view from wall and temple tops.

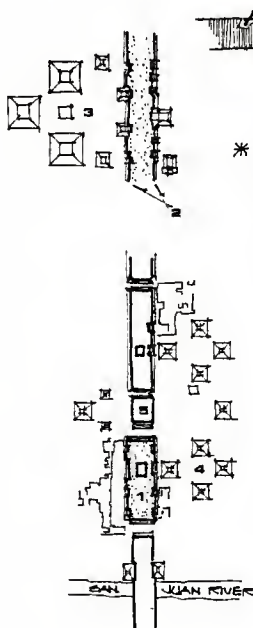


Miscellaneous Observations The clearest example of spatial "crescendo" in this author's experience exists along the Avenue of the Dead as one approaches the Plaza of the Temple of the Moon (Ill.#34). This crescendo, similar to that found at Versailles, is measured by the rhythmic occurrence of stairs mounting the side walls (Ill.#37), and given variation by the sunken courtyards previously discussed. "Dimenuendo" is the obvious result of walking in the opposite direction. The crescendo is clearly and logically terminated as the Avenue opens out into the Plaza of the Temple of the Moon. It is equally logical that the dimenuendo lacks a termination at the opposite end, but rather trails off into nothing as it would traditionally in music composition.



It is difficult to resist a comparison of present day Brasilia and ancient Teotihuacan. Both are extensively planned capitol cities, and are very formal in their arrangement.

The grid, rectangles, continuity of long straight lines terminated by powerful focal points, symmetry, and massive scale seem to describe this city as an aesthetic composition. The line scheme is dominant, and the major element of continuity. The asymmetrical placement of the Pyramid of the Sun is the only surprise in the plan, and is quite welcome. It is a plan of great unity, little variation, and in my experience is the product of a "rational" design process with a single plan being pursued across several centuries and the power of control centered in the hands of very few.



AESTHETIC LOGIC STUDY TEOTIHUACAN

COMMENTS:

- * THE GREATEST ELEMENT OF CONTINUITY IN THIS CITY IS THE "LINE" FORMED BY THE AVENUE OF THE DEAD. DUE TO ITS GREAT LENGTH IT WOULD BE GRAND, BUT MONOTONOUS IF THE FOLLOWING TWO TYPES OF VARIETY WERE NOT INTRODUCED:

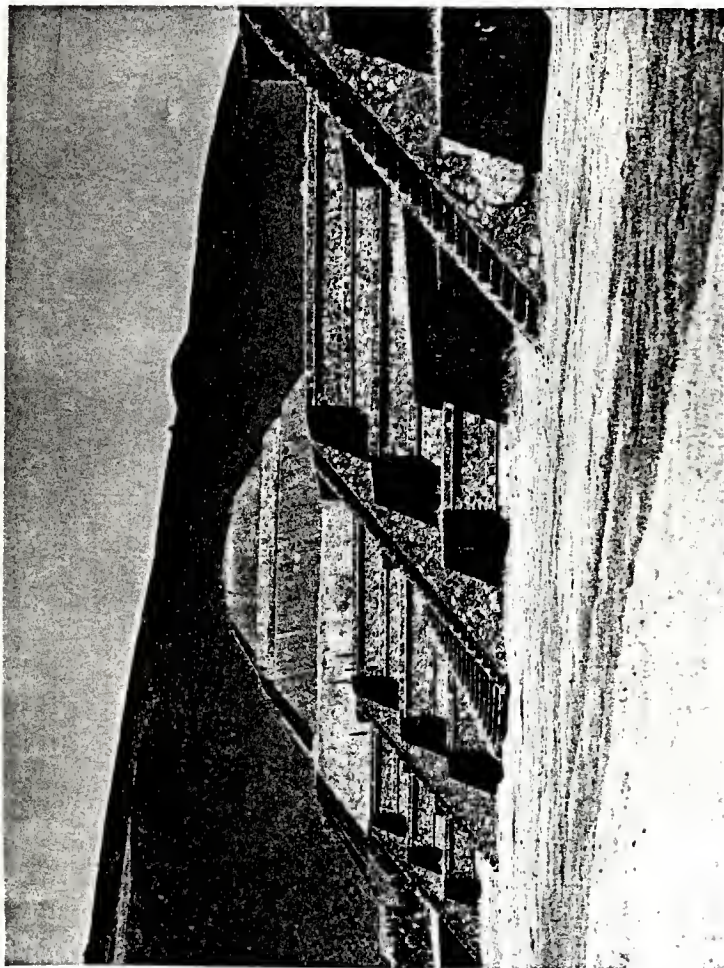
- A. THE INTERPLAY OF THE "RHYTHM" AND "COUNTER-RHYTHM" OF THE STAIRS ON THE OPPOSING SIDES OF THE AVENUE. SOMETIMES THESE RHYTHMS ARE SYMMETRICAL AS AT #1, AND SOMETIMES ONLY SYMPATHETIC AS AT #2. ADDITIONAL "LATERAL" DIVERSITY OF VARIETY EXISTS IN THE DISSIMILAR COMPLEXES SUCH AS AT #3 AND #4 WHICH FLANK THE SIDES OF THE AVENUE
- B. THE INTERIM "COURTYARDS" ALONG THE AVENUES LONG AXIS SUCH AS AT #5.

The natural hill mass behind the Pyramid of the Moon reinforces its architectural mass (Ill.#36). While it is probable that this was inadvertant, or subconscious, it is necessary in my opinion in its becoming "point" and the Pyramid of the Sun (though larger) becoming "counterpoint" in the urban image of this city. It is not a defensive city, but rather a very open one which may have been part of its problem at about 900 A.D. when it was burned.

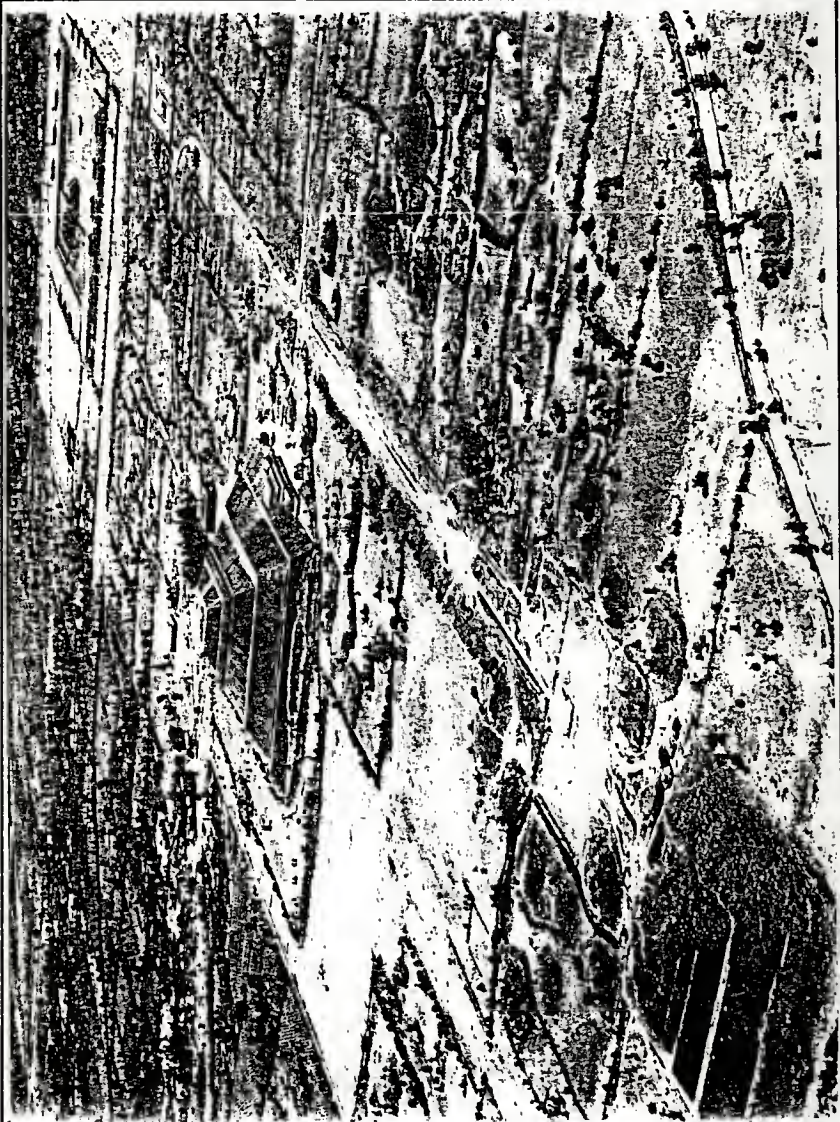


"TEOTIHUACAN: THE PYRAMID OF THE MOON"

Ill. # 36



"AVENUE OF THE DEAD AND THE PYRAMID OF THE SUN" at Teotihuacan



5

tzintzuntzan

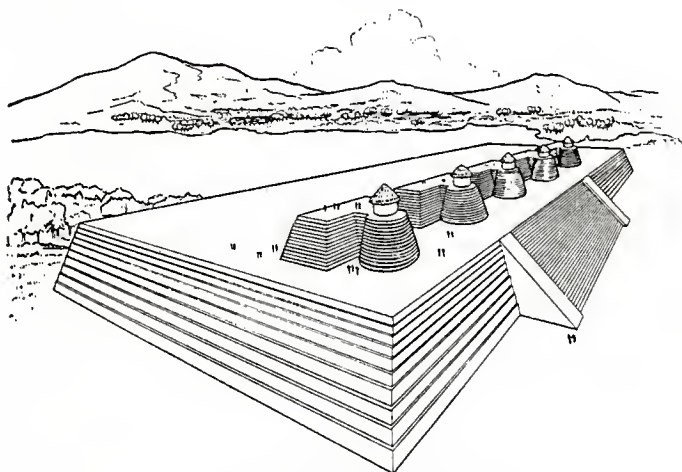
Chapter 5

TZINTZUNTZANLocation

Tzintzuntzan lies on the east side of Lake Patzcuaro in the state of Morelia, Mexico, and rests about half way up a hillside at the base of a small mountain overlooking the lake and village below.

Site Description³¹

The partially restored ruin is not extensive compared to the others studied. It consists of a major rectilinear terrace roughly 465 yards by 275 yards, surmounted by five elliptical "yacatas" (or temples) each joined to a single rectangular terrace.

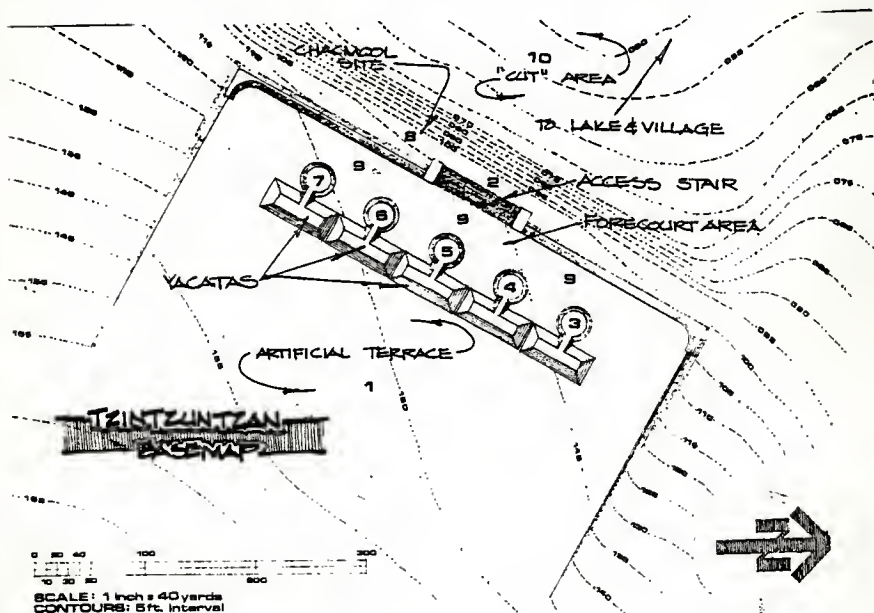


Tzintzuntzan, *yacatas*, c. 1500. Perspective

Access to these yacatas was via a 100 yard wide stair. It would appear that these indians cut earth forward (down hill from the ruin) and carried it up to fill the major platform. The excavation method employed must be purposeful since it is undoubtedly the most difficult technique. The mass of the terrace does parallel the contours of the slope. Little besides the five yacatas and the platform remains since the Tarascans traditionally construct their buildings of wood. An example of such a building has been preserved in the Denver Art Museum.

Major Features³²

It is very difficult to compile an accurate map of the site at this time as the ruin is not fully excavated and restored. Major sources contradict each other and themselves about its configuration, position, and orientation.



The following list should help to orient the reader and to familiarize him with the currently excavated features shown in Illustration #40.

1. Artificial Terrace (possibly a commercial zone)
2. Access Stair
3. Yacata I (partially restored)
4. Yacata II (burial temple)
5. Yacata III (burial temple)
6. Yacata IV (burial temple)
7. Yacata V (partially restored) contained two tombs with multiple burials.
8. Chacmool (site of a burial and a Chacmool statue)
9. Urban Foyer
10. Cut Area (an area now used for farming; prior use is unknown, but was perhaps used for public gathering, farming, or as a residential area.

Chronology

Tzintzuntzan (the Place of the Hummingbirds) is the most important of three cities in the Tarascan league formed by King Tariacurie at the end of the 14th century. His successors extended their kingdom to the south and west by military action. Perhaps their best known military successes were against the Aztecs. In 1479 A.D. they were one of the few tribes to repulse the Aztec empire. The Patzcuaro Valley was previously inhabited prior to their arrival. They are currently thought to have spread the techniques of refining copper, gold, and silver to the Altiplano during the 10th century. Their garrisons faced Aztec garrisons across the Rio Balsas at the time of Cortez.³³

Culture³⁴

The western cultures of Mexico remain an unexplained mystery at this time. Colima, Jalisco, and the Tarascans seem to have dominated it. The Tarascans had "Chichimec" (barbarian) customs such as the smoking of clay pipes, and worshipped a Toltec god (Chacmool). They spoke a tongue quite different than Nahuatl (the language of the Toltecs), but they thought their origin to be the cave of Chicomoztoc, from which the seven Nahua tribes were thought to have invaded central Mexico. This invasion gave rise to the Toltec dominance of the 12th century.

The Tarascans are most famous for their obsidian carving, engraving, featherwork, metal work, and a pottery quite similar to that of the Mochicans in Peru. Their people still live in these same high mountains doing weaving, sculpture, and metal-work. Known for their independence, they were still considered a threat during the unrest created by the power shift in progress during my research in 1975.

Archeological Efforts

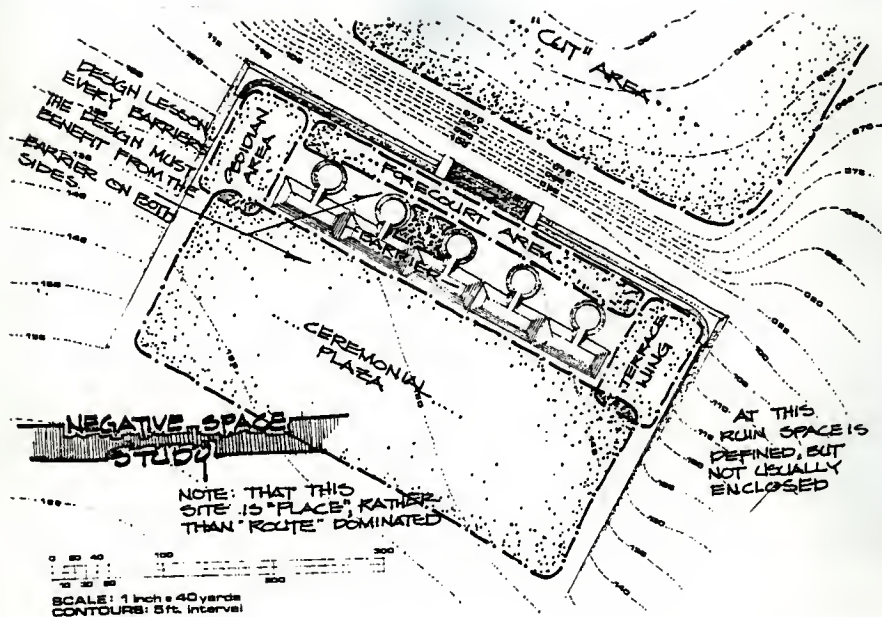
Only the two following investigations are mentioned in most sources:

1. Alfonso Caso (1937-1938)
2. Daniel Rubin de la Borbolla and Jorge Acosta (1939-1941).

Applied Studies

Negative Space Study The largest space in the ruin is the rectangular "Ceremonial Plaza" which is 220 meters by 475 meters (104,000 square meters) although its considerable size is now not obvious as trees are now growing on the artificial terrace.

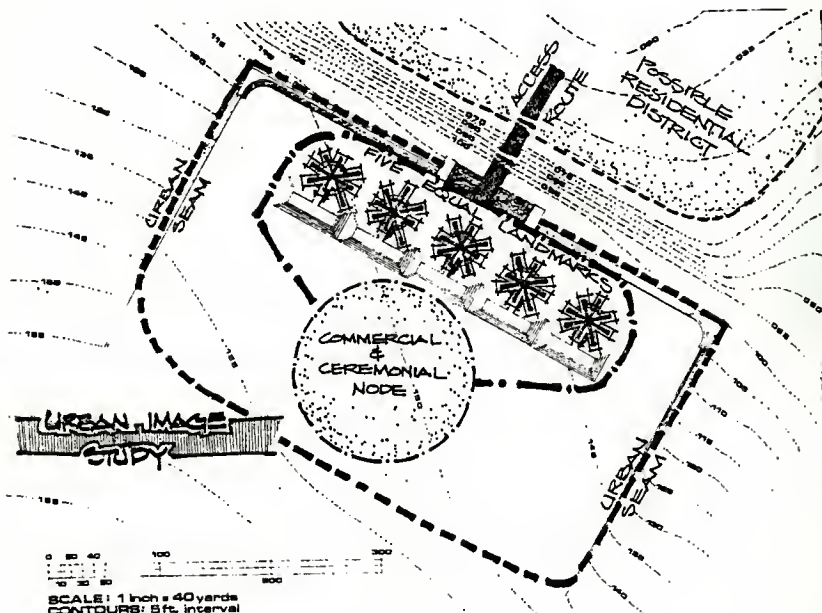
Other than the access route the only other spaces are those spaces between the yacatas, and the wings of the terrace (Obsidian Area). The squeezed spaces between the yacatas are roughly 40 meters by 40 meters (1600 square meters). The single rectangular artifical terrace parallels the contours of the hill and is surmounted by five eliptical yacatas of equal size skillfully placed on line along the forward edge of the terrace. This simple arrangement accomplishes a number of useful ends with considerable simplicity as we shall see. Not only the terrace, but the site is of the very large scale typical to outward looking mountain vistas. The placement of the yacatas reduces this scale considerably by screening the view. Spatial continuity is not much of a problem with this limited number of elements in the design (Ill.#41).



Ill. # 41.

Urban Fabric If the terrace itself is an urban grain than it is a very coarse one indeed (475 meters by 275 meters) surmounted by five medium sized grains which are 60 meters by 60 meters (or 3600 square meters in size). There are insufficient elements to make a study in urban texture and pattern. Bernal suggests³⁵ that other buildings lined its edges, but if this is so they were evidently made of wood. This is still the traditional material for Tarascan buildings, so it is not surprising. It is fair to notice that the design intent is total symmetry perpendicular to the contours of the hill, facing the lake and modern village below (Ill.#42).

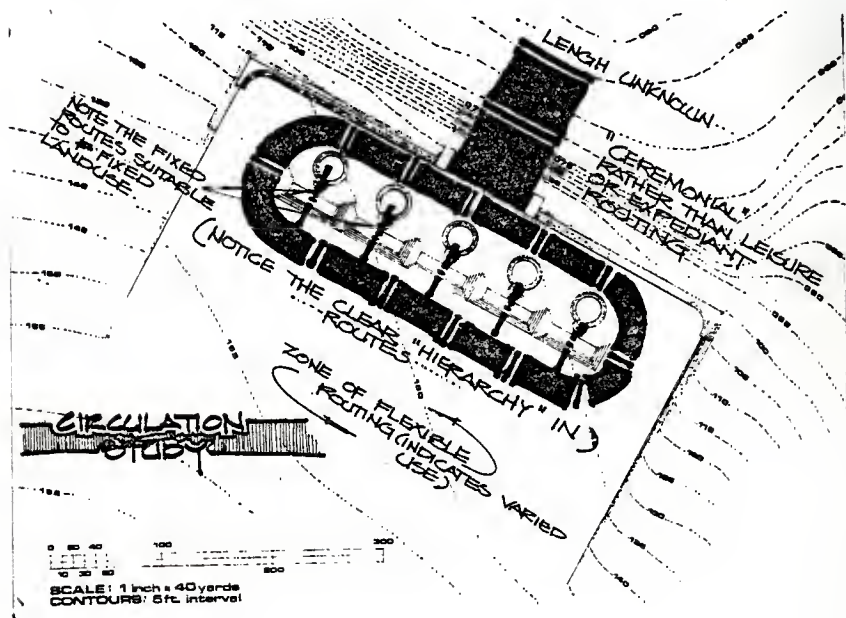
a "node", but might also be a district if permanent buildings were present as Bernal suggests. If this is so, the edge of the terrace would become a "seam" with the access stair as part of the only fixed "route" still apparent. The considerable disparity between current written research works and the actual reconstruction make detailed observations difficult.



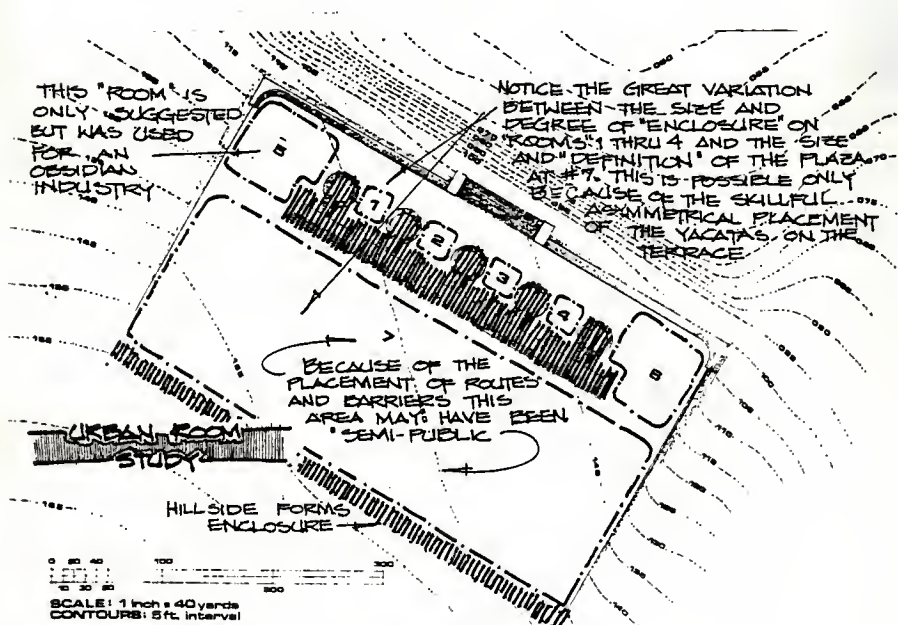
Ill. # 43

Circulation The length of the route implied by the 100 meter wide access stair is unknown though it would seem absurd to terminate it on the narrow earthen terrace below. Perhaps it extended, as now, to a village below; or perhaps it led only to the cut area below the artificial terrace. In the former condition, the cut area would likely be a district on the sides of the route (or fields as they are today). If the latter is true it would imply that this cut area was an urban node of

sorts. Surprisingly, a hierarchy of width is present even in this simple composition. Notice that the forecourt, or balcony, forms two routes perpendicular to the stair, each being about half its width. Still narrower stairs ascend the back (or Ceremonial Plaza) side of the yacatas. This indirect routing is leisure in its character and deliberately directs views. Also notice that the fixed route is associated with the relatively stable religious use, while the circulation is left flexible in the area of the Ceremonial Plaza behind suggesting the potential for changes in use at different times. Burials are found beneath the floor of the forecourt area suggesting some stability of use in that vicinity.

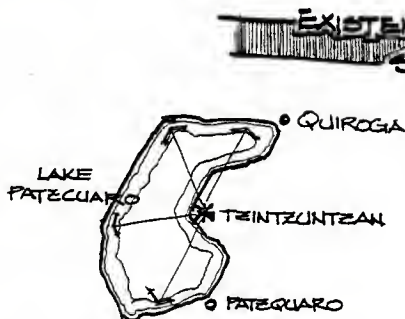


Urban Room Analogy The Ceremonial Plaza may have been a well defined, but certainly poorly enclosed, urban room using the hill for one wall and the yacatas for another. This use of yacatas also forms strong walls on three sides of the forecourt "room". The openings to the plaza area are at the corners of the plaza. The "ceiling" is the immense mountain sky, and the "floor" is a single flat artificial terrace. One might view the placement of the yacatas as "furniture" used as a deliberate tool in shaping view and circulation. If so, they are not the center placement that we have seen in the cities previously discussed. This leaves the plaza space free of obstructions, and therefore more functionally flexible.



Existential Space At the city level, or scale, the terrace is oriented at sixty degrees west of north facing the lake below. Certainly everything must have been recorded from the position of the yacatas.

At the regional scale the city itself was probably used as a position from which to reference distances along the edge of the lake. It is a surprising distance from the edge of the lake (one or two miles) to the city, but the lake level has also dropped since the time of Cortez. Finally, we will see that it is similar to Palenque in that it is sited on a hillside.

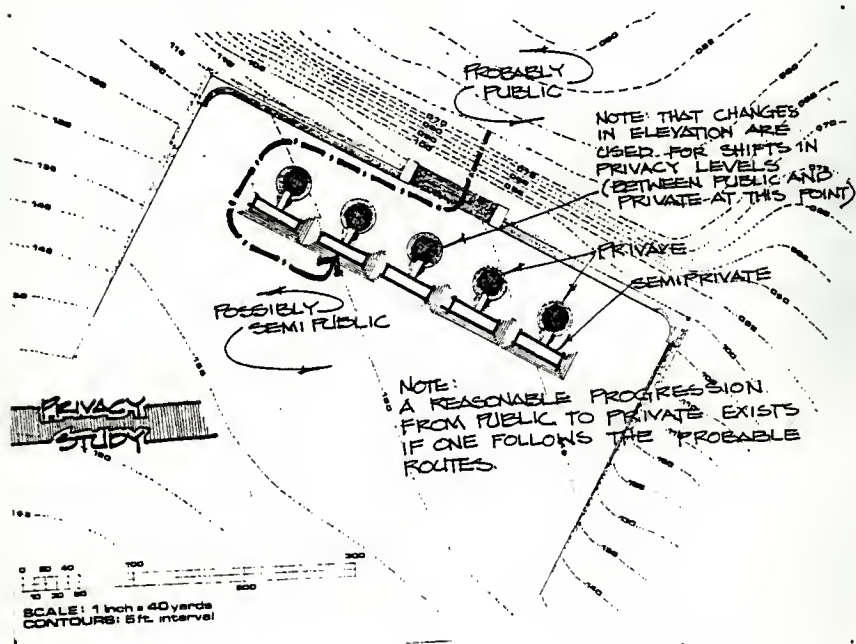


NOTE:
POSITIONS ON, AND NEAR THE LAKE
WERE PROBABLY RECKONED FROM
THIS CITY.....

Ill. # 46

Privacy Study Once again, although simple, evidence of a jump from public or semi-public space directly to private or semi-private can be seen in the presence of the yacata tops above the main terrace (Ill.#47). This is probably possible due to the level change and the presence of a semi-private space (the rectangular portion of each yacata) which precedes the private yacata along its access route. It provokes the obvious, but unanswered, question, why five? At any rate this juxtaposition of private and public is a little unusual both in con-

temporary design and in prehispanic Mesoamerica. It usually demands the use of additional barriers. Perhaps the walls of the temporary buildings that crowned each yacata in ancient times would help to make it more consistent both with Sommer's writings and other Mesoamerican examples.

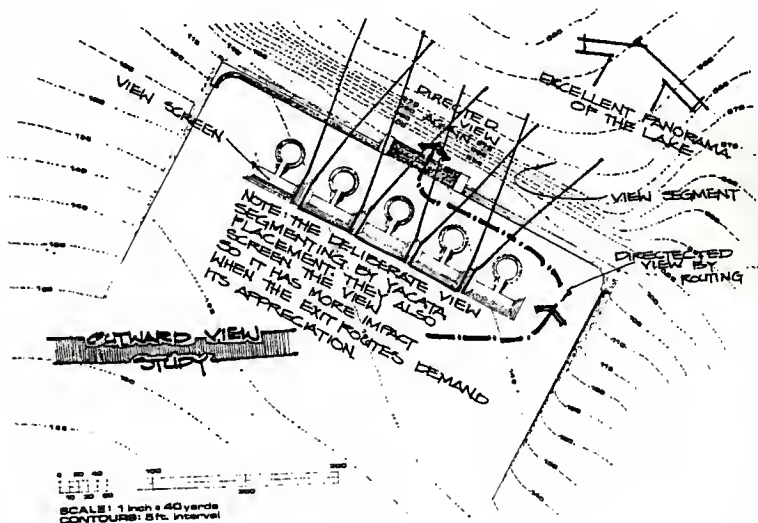


Ill. # 47

View Study Clearly the dominant concern for this ruin, and rightly so, is the thirty mile view of the lake below which demands recognition. The view down the stairs towards it is more than chance. However, let us reverse the route and instead approach up the hill toward the terrace with its yacatas. You quickly discover the purpose for the builders cutting below the terrace and carrying the earth up to form the terrace. As previously mentioned, this is certainly not the most easy manner to generate a level area on the side of a hill. It was done to

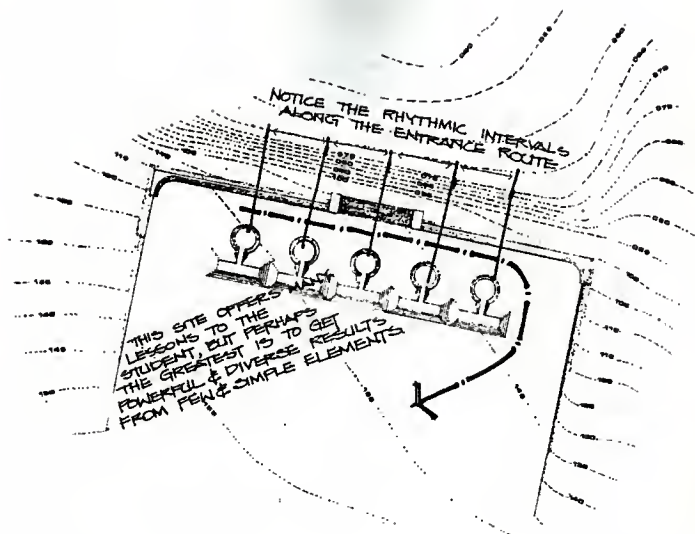
exaggerate the rise of the hill, the grandeur of the terrace, and its yacatas. Ascending the stairs, the yacatas unusual outline is emphasized against the sky, and the disorder of the market life beyond the yacatas could be concealed.

From the Ceremonial Plaza the lake view is screened, or segmented, by the yacatas; but the outward view to the lake is demanded by the exit routing.



Ill. # 48

Miscellaneous Observations The yacatas not only "thrust" the view from the "Foyer" toward the lake, but are rhythmic in their appeal as one traverses the route to the plaza (Ill.#48). They also give sanction, or "backwater" areas, off the circulation route for such viewing. The yacatas would, however, seem to be ridiculously terminated in modern terms by a small wooden structure considering the monumental approach preparations.



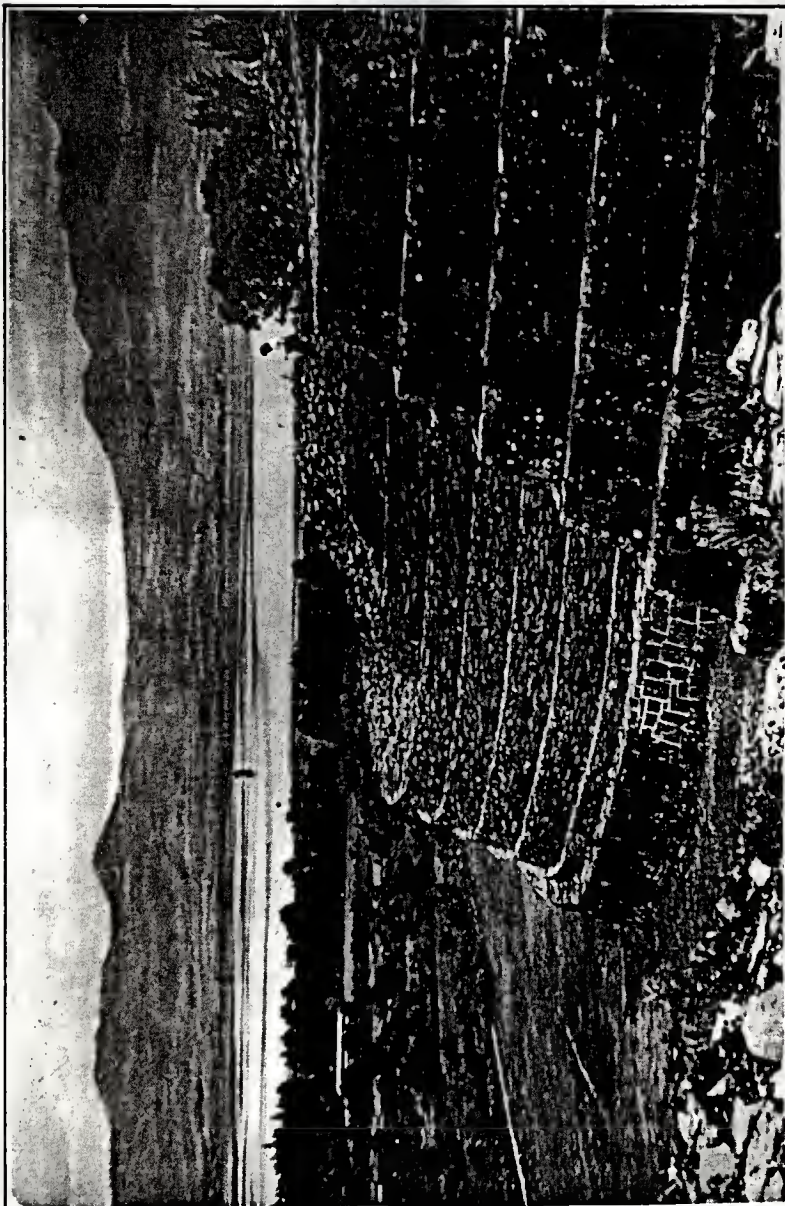
Ill. # 49

It is a construction which ignores military considerations. This may be because of the skill of the Tarascans in holding the Aztecs at a distance, or because of the lack of forage that restricted an army from making such an advance.

As an aesthetic composition it is symmetrical in balance. Its interest lies first in its outward view, and secondly in the play of five small circles (yacatas) against a massive rectangle which defines negative spaces of surprising rhythm and variety by their skillful placement. The presence of five equal focal points is extraordinary. Above all it is a composition of great simplicity and small relative size. This suggests both strong prior planning and either a small population, or a limited governmental power over a larger population. It is reasonable to speculate that this is a religious, commercial, and governmental center for a widely dispersed rural population.

Ill. # 50

"LAKE PATZCUARO FROM TZINTZUNTZAN"



6

monte alban

Chapter 6

MONTE ALBAN

Location

Monte Alban lies nine kilometers west of the modern city of Oaxaca in Mexico.

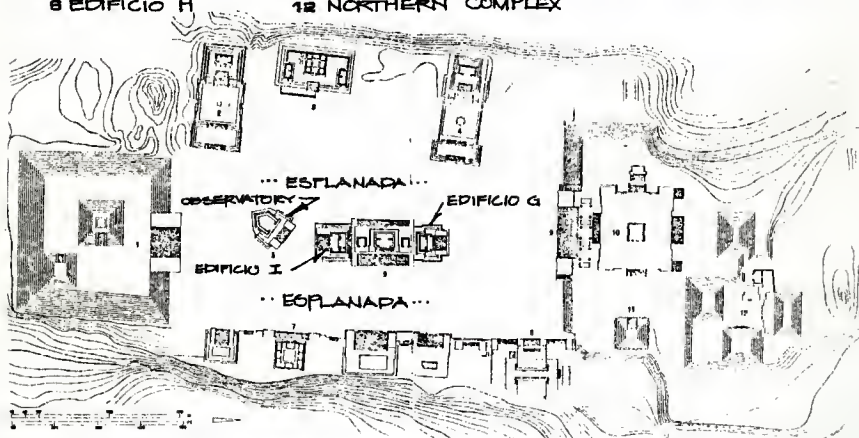
Site Description³⁶

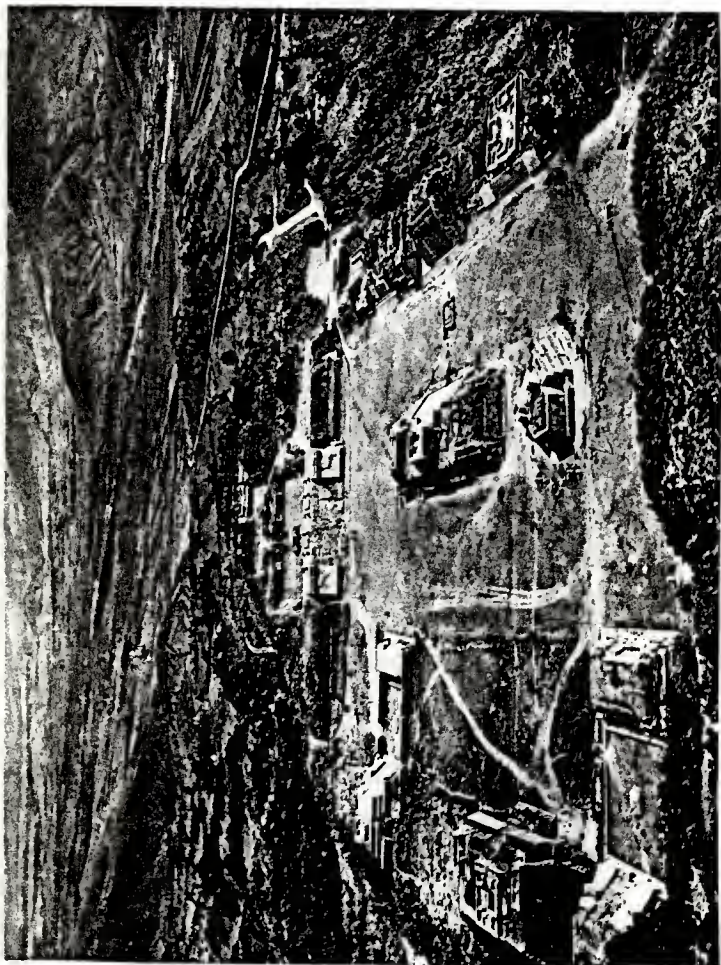
The site is an artificially flattened "cerro", or hill top, 6000 feet above sea level and 200 feet above the valley floor below. The main plaza is roughly 300 meters by 200 meters and is a small part of a sixteen square mile archeological zone. The surrounding hillsides are strongly terraced, which verifies the existence of a much larger area of developemnt than that which is restored (Ill.#52).

Major Features

- | | |
|------------------|---------------------|
| 1 PLATAFORMA SUR | 7 EL PALACIO |
| 2 MONTICULO M | 8 JUEGO DE PELOTA |
| 3 LOS DANZANTES | 9 PLATAFORMA NORTE |
| 4 SISTEMA IX | 10 PATIO HUNDIDO |
| 5 MONTICULO J | 11 EDIFICIO A |
| 6 EDIFICIO H | 12 NORTHERN COMPLEX |

**MONTE ALBAN
BASEMAP**





"MONTE ALBAN FROM THE SOUTH"
I11. # 52

Archeological Efforts

The excavations were begun in 1951. Alfonso Caso and Ignacio Bernal are responsible for much of that which is currently known. Other researchers of note are Dupaix and Marquina. In addition to the clearing of the Esplanada, rich tombs such as Tomb 104 were unearthed yielding an extensive treasure in Mixtec gold offerings.

Chronology³⁷

Pre-classic Period

900-300 B.C. Monte Alban I: This is a period of Olmec influence. Mound II and Los Danzantes were completed; polished grey pottery was made; jaguar and "baby-faced" gods were worshipped; and deliberate planning was evident in the formality of building layout.

300-100 B.C. Monte Alban II: A period of Proto-Mayan influence; Monticulo J was built; stealae were carved; bowls with three legs made; and vaulted tombs constructed.

Transitional Phase

100 B.C.-200 A.D. Teotihuacan exerted its influence; "stirrup jars" were made; Tlaloc was worshipped.

Classic Period

200-500 A.D. Monte Alban IIIa: Zapotec culture evolved to its maturity; hereditary and specialized theocracy developed; zoomorphic pottery was utilized; elaborate burials; Xipe Totec (the god) was introduced; major leveling and terracing was accomplished; and columns were introduced, as were sunken plazas.

500-800 A.D. Monte Alban IIIb: This is a "baroque" period; stucco sculpture was used; Monte Alban IIIa developments were continued.

Post Classic Period

900 A.D. Monte Alban IV: Zapotec civilization declined and the site was eventually abandoned.

Post Classic Period (continued)

1000-1200 A.D. Period of Toltec influence

1300 A.D. Monte Alban V: Mixtecs occupied the city primarily as a burial site; gold and jade work appeared; militaristic period; mass production of pottery in a cylinder shape with molded applications were common; architecture was decorated with geometric frieze work similar to Mitla; colorful painting and codices; color schemes were both complex and sophisticated.

1400-1500 A.D. Zapotecs and Mixtecs allied against the Aztec attacks by Moctezuma I. (1440-1469) and others.

1521 A.D. Beginning of Spanish influence.

Applied Studies

Negative Space Study While the plaza below the Palace of Columns is about 100 meters by 200 meters (20,000 square meters), the great Central Plaza is really one single plaza 350 meters by 200 meters (70,000 Square meters) of artificially leveled space in which buildings have been placed axially as urban furniture. Unquestionably the dominant shape is the rectangle. Squares of a lesser size exist in the compounds around this large rectangle. The huge negative space of the Central Plaza is the city's most dominant feature, and probably served as public gathering space for a large, well organized society (Ill.#53).

Urban Fabric Study The largest urban grain is the building mass in the middle of the Central Plaza (125 meters by 50 meters); however, grains of 40 meters by 40 meters are more common.

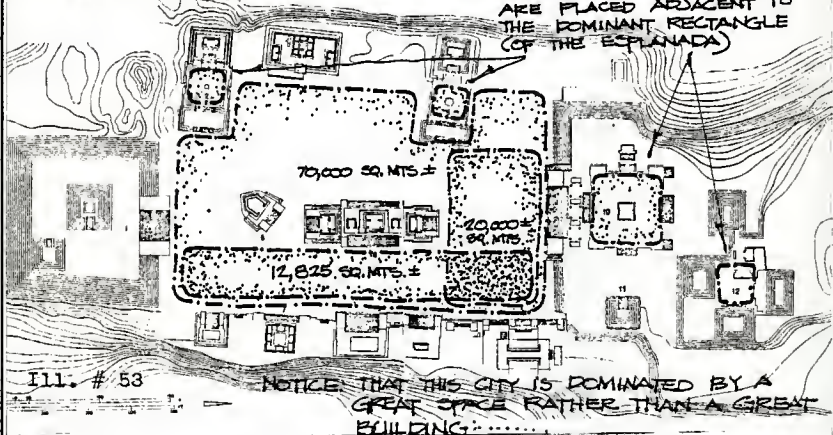
The texture is coarsest at the crest of the hill and becomes fine immediately outside the contained area of the hill top as expected due to the limitations on construction imposed by steep slopes.

The pattern follows a north-south axis enforced on a

NOTE: THAT THE GREAT ESPLANADA
RECTANGLE CAN ALSO BE EASILY
UNDERSTOOD AS A SERIES OF
... OVERLAYING LESSER RECTANGLES

NEGATIVE SPACE STUDY

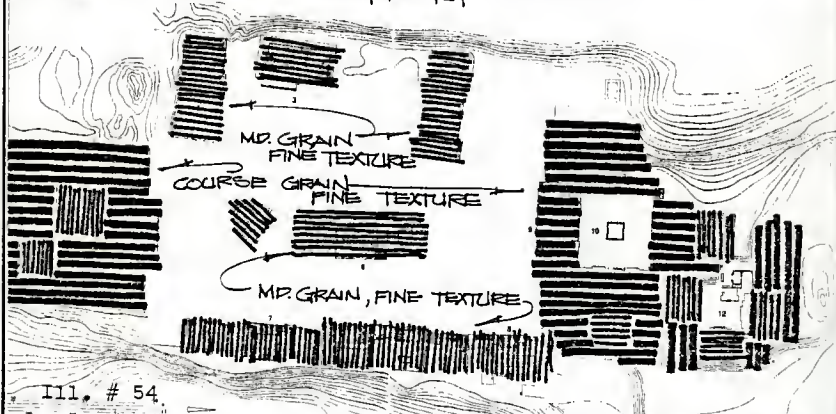
NOTE: THAT LESSER SQUARES
ARE PLACED ADJACENT TO
THE DOMINANT RECTANGLE
(OF THE ESPLANADA)



NOTES:

- 1) THAT THIS AREA IS DOMINATED BY COARSE & MEDIUM GRAINS TYPICAL OF AN URBAN CORE
- 2) THAT THE FINE TEXTURES IMPLY ZONING BY LANDUSE.
- 3) THAT THE PATTERN IS IMPERFECTLY NORTH-SOUTH.

URBAN FABRIC STUDY



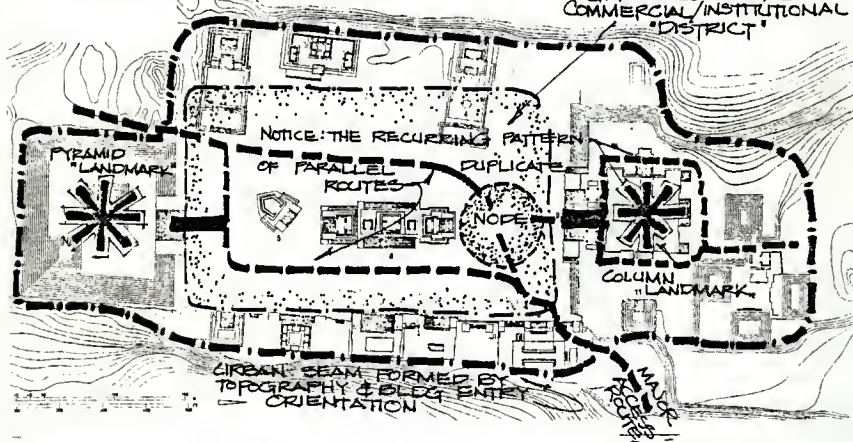
hill top which is roughly sympathetic in its long axis. This pattern of influence dwindles as building proceeded from the immediate periphery of the plaza down the sides of the hill. The influence of slope eventually exerts its dominance over this pattern (Ill#54).

Urban Image Monticulo J becomes a landmark due to its unusual orientation (S 40°W). Such a deviation usually happens in a modern complex when a designer must accept the conservation of an older element in a new grand scheme. It is encouraging to report that other archeological dating methods seem to support this empirical observation. The colonade at the head of the stair dominates the north end of the Central Plaza. The juxtaposition of columnade against pyramid across a plaza recurs in microcosm in the North Compound, and is probably unique to this city.

* NOTICE: THE "DUMBBELL" LAYOUT WITH TWO LANDMARKS JUXTAPOSED ACROSS A MAJOR OPEN SPACE (AND THAT ONE OF THE LANDMARKS IS A COLUMNADE WHICH IS AN UNUSUAL FEATURE IN THE AMERICAS).

URBAN IMAGE STUDY

NOTE: THAT THE TOTAL ESPLANADA MIGHT BE CONSIDERED A COMMERCIAL/INSTITUTIONAL "DISTRICT"



The obvious node is the Central Plaza itself though some sections of it would inevitably be more active than others, dependent on adjacent land use and micro-climate.

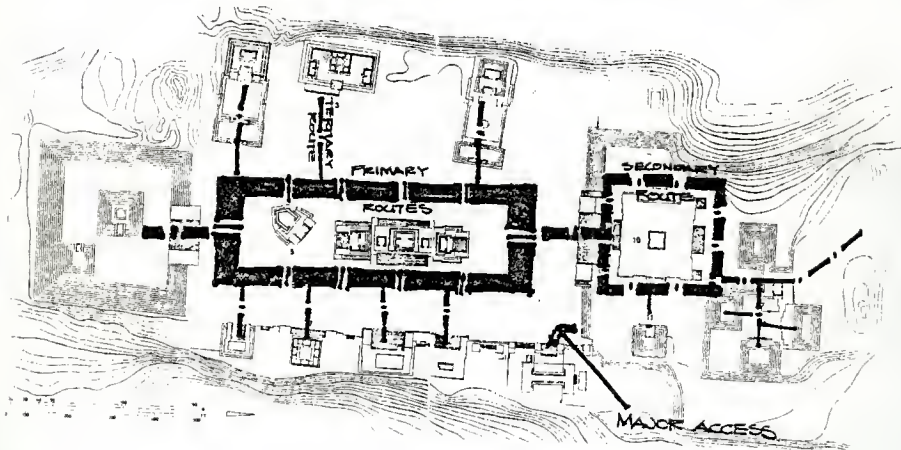
The only district apparent in the reconstructed area is the periphery of the plaza; although, such development was probably further divided by the hill mass into subdistricts (e.g. east slope, west slope, etc.).

Seams and routes, while they undoubtedly existed, are not a dominant feature in the reconstructed zone. It would seem likely that such routes, as they are reconstructed, will occur along ridge lines and other routes of ease for pedestrian movement.

Circulation Study The routes, such as they become apparent, are offsets parallel the the north-south axis that organizes the hill top. The hierarchy is difficult to evaluate at this stage of excavation, but it appears to exist in the vicin-

NOTE: THE CLEAR HIERARCHY
AND "DOCTRINE" ORDER
THAT TYPIFY THE CIRCULATION
SCHEME FOR THIS SITE.....

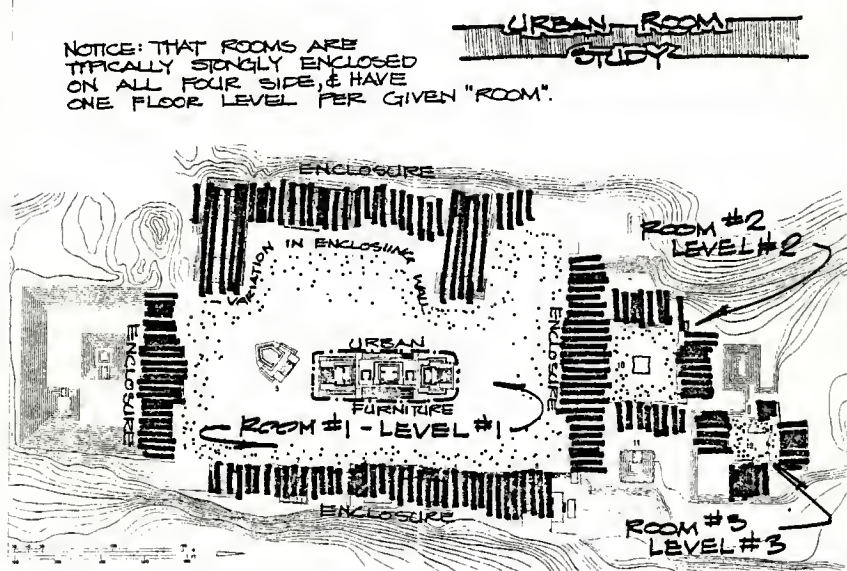
**CIRCULATION
STUDY**



of the palace courtyard where routes are more broad than those more distant from the Central Plaza. From this courtyard, the main stair axially enters the Central Plaza where routes are loosely controlled by the buildings located within that space.

Urban Room Analogy Perhaps the most surprising aspect of this ruin is the total enclosure of the plaza by the continuous containing perimeter wall. This wall is devoid of openings similar to those found at Teotihuacan, particularly on the east side of the plaza. The ceiling line of that wall is very even as at Teotihuacan.

Floor levels vary in elevation by building groups, rather than by individual buildings. One level per room is the typical pattern.

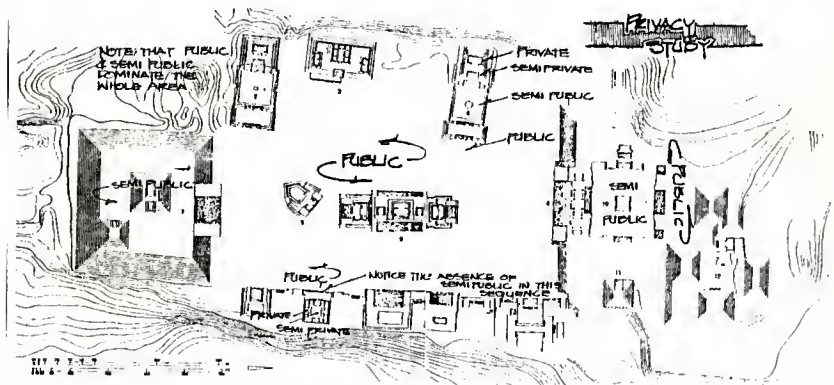


Ill. # 57

If the Building masses in the Central Plaza are thought

of as furniture, than they are centrally located. Therefore it is interesting that with such a simple location this furniture can generate an unexpected variety of spaces when actually experienced. This is due in part to the variations of the enclosing wall, and because this "furniture" actually forms an enclosing wall concealing the near symmetry of the layout from the viewer when he is down in the plaza. Without the preconditioning of the introductory overview of the plaza, the viewer would not be as aware of its symmetry.

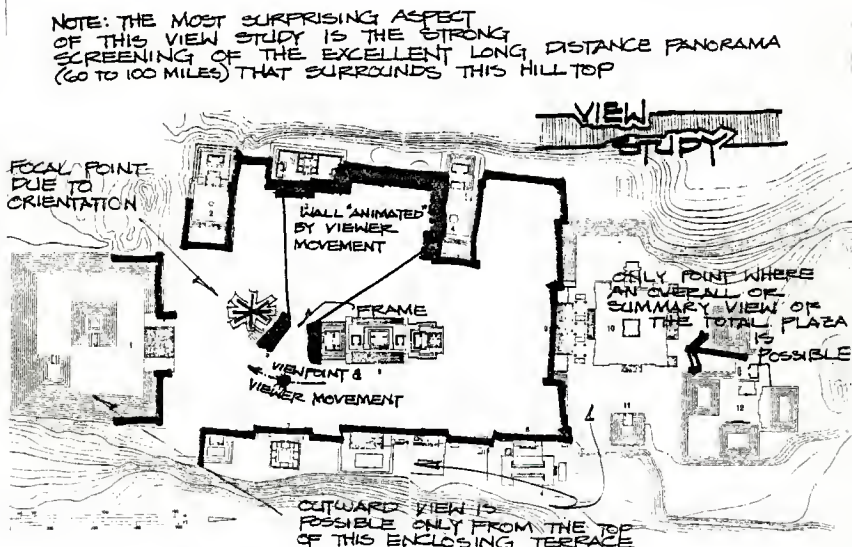
Privacy Study The limited amount of private space underscores the public use given to the excavated and reconstructed zone. However, traces of a hierarchy can be seen in the progression from private and semi-private interior spaces to public exterior spaces (often skipping semi-public). Semi-public spaces are present in the "Palace" and in the "Auditorio", but are not a consistent part of the typical privacy sequence at Monte Alban. Perhaps it was a compromise based on other values or that their sense of community was stronger than our own.



Isovists Study As previously noted, the total screening of the panoramic sixty mile view is quite unexpected. One must mount the enclosing wall to enjoy this view.

The use of enframement is present between Monticulo J and adjacent buildings. This is probably inadvertant, as it its more the exception than the rule in this city. The enclosing wall beyond this "frame" is "animated" or races in this opening as the viewer walks along the plaza looking through this opening. The Japanese were quite familiar with this technique. By placing a lantern or rock at a lakes edge, they could make the far shore "race" with respect to it. You may see this by holding up a single finger in a stationary manner at about twelve inches from your eyes, then move your head from left to right.

Segmented views are not a common feature of this city.

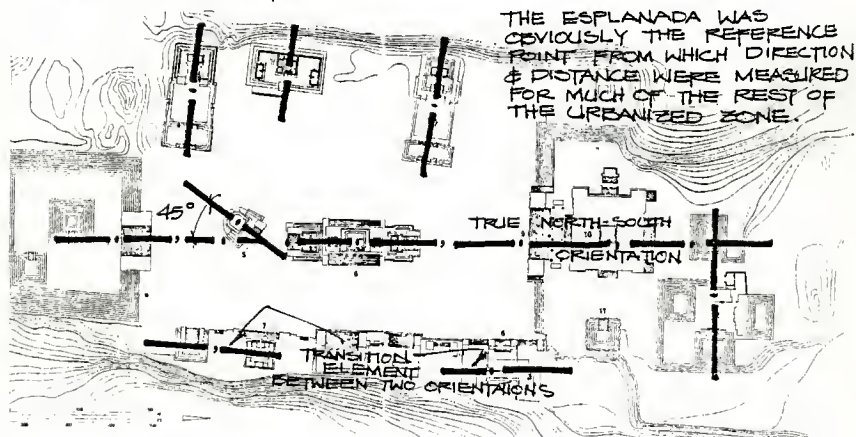


Miscellaneous Observations Level changes and shifts in route orientation are used to phrase the sequence of events as one progresses through the Central Plaza, past the Palace Courtyard, to the summit of the hill to the north for the only summary view the complex that is possible. These changes of orientation are brief and the terminating views are poorly conceived compared to those at Xochicalco as we shall see in chapter nine.

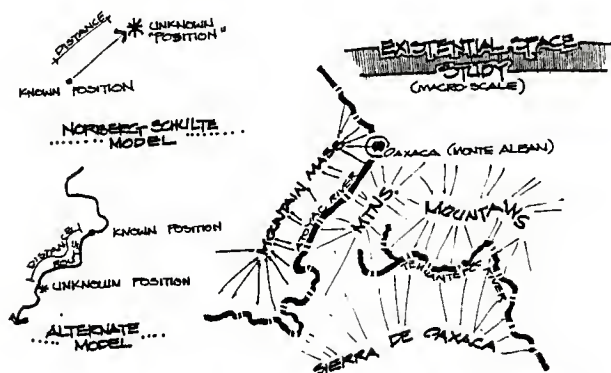
The resolution of directionality in the conservation of Monticulo J is a credit to the designers of this complex. Considerable control and the pursuit of a single concept over a substantial time period, similar to Teotihuacan, was necessary to complete such a plaza precinct. The variation of exterior wall is much greater than at Teotihuacan, however. Additionally, this ruin is "place" dominated, while Teotihuacan is "route" dominated.

NOTICE: THE OLD BLDGS. ORIENTATION HAD TO BE ACCOMMODATED WITHIN THE NEWER N-S "GREAT PLAZA" SCHEME. (COMPARE TO TAJIN & TEOTIHUACAN GROWTH) THIS IS SKILLFUL CONSERVATION.

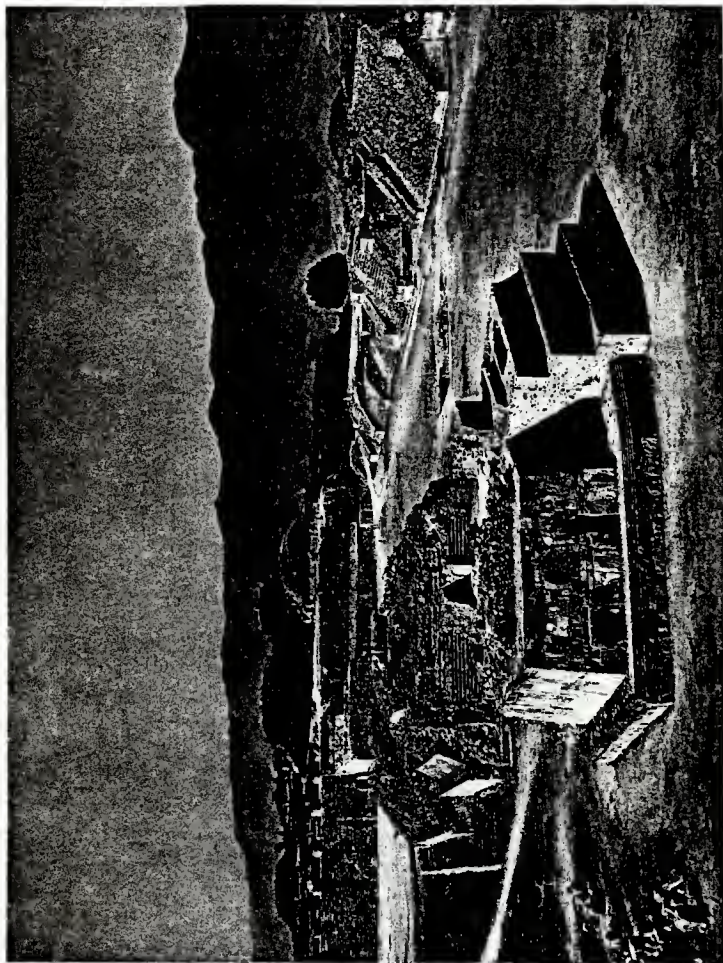
EXISTENTIAL SPACE STUDY
... MICRO SCALE ...



Finally, the grandeur in Teotihuacan rests, to a substantial extent, with the massive buildings; while this complex is devoid of such dominant buildings, and gains grandeur almost solely from cohesive negative space.



IN THIS ROUGH MOUNTAIN TERRAIN ROUTES UNDOUBTEDLY FOLLOWED THE RIVERS. THE COMMANDING POSITION OF MONTE ALBAN NOT ONLY HAD TRADE AND MILITARY SIGNIFICANCE, BUT MUST HAVE ALSO ACTED AS A SPATIAL ORGANIZER. "POSITION" WAS PROBABLY PERCEIVED AS SOME DISTANCE FROM THIS CITY ALONG THE VALLEY ROUTES (AS OPPOSED TO THE "DIRECTION-DISTANCE" SYSTEM GIVEN BY NORBERG-SCHULZE).



"CENTRAL PLAZA AT MONTE ALBAN" (Note the orientation of Monticulo J and the enclosing East Wall beyond)

7

palenque

Chapter 7

PALENQUELocation

This ceremonial center is located on the north slope of the densely vegetated Thumbala Mountains facing outward in the direction of the Gulf of Mexico in the state of Chiapas, near Villahermosa.

Site Description

Only a small area of some 550 by 300 yards have been cleared from this extensive site which is believed to stretch some three to five miles into the rough terrain of this luxuriant mountain jungle (forming a city of perhaps 550 buildings). A small stream runs through the site. Several of the monuments have been reconstructed. The proportions and scale of the site are a sharp contrast to Teotihuacan, but the work is exquisite in its detail. The climate is somewhat more moderate than the Yucatan sites such as Chichen-Itza. Stucco work at the site is particularly famous, as is the tomb found under the Temple of Inscriptions. Building stone was close at hand. Palenque has the highest annual rainfall of those sites emphasized in this study.

Archeological Efforts³⁸

- 1723 Indians rediscovered the site.
- 1780 Palenque was noted by such writers as Ordonez y Aquilar (1773), Jose Antonio Calderon (1784), Antonio Bernanconi, and Captain Jose Antonio del Rio (1786) who exposed the site.
- 1805 Guillaume Dupaix explored the ruin, and his work published in 1834 in Paris.
- 1831 Baron Jean Frederik Maxmillian de Waldeck spent two years at the site in the Temple of the Count.
- 1837 John L. Stephens cleared the site and made accurate drawings of work on his travels in Central America. This attracted the interest of Desire Charnay, Teobert Maler, and others.

- 1923 Edouard Seler, Sylvanus G. Morley, and Tranz Blom conducted studies on the site.
- 1940 First maintenance of the site; Miquel Angel Fernandez assumed responsibility for the Museum of Anthropology.
- 1952 Alberto Ruz l'Huillier discovered the crypt under the Temple of Inscriptions.

Chronology³⁹

Since there is no history for this city, archeology alone yields the following sketchy chronology.

Pre-classic Period

- | | |
|----------|--|
| 300 B.C. | Early pottery proves the early occupation of the site. |
|----------|--|

Classic Period

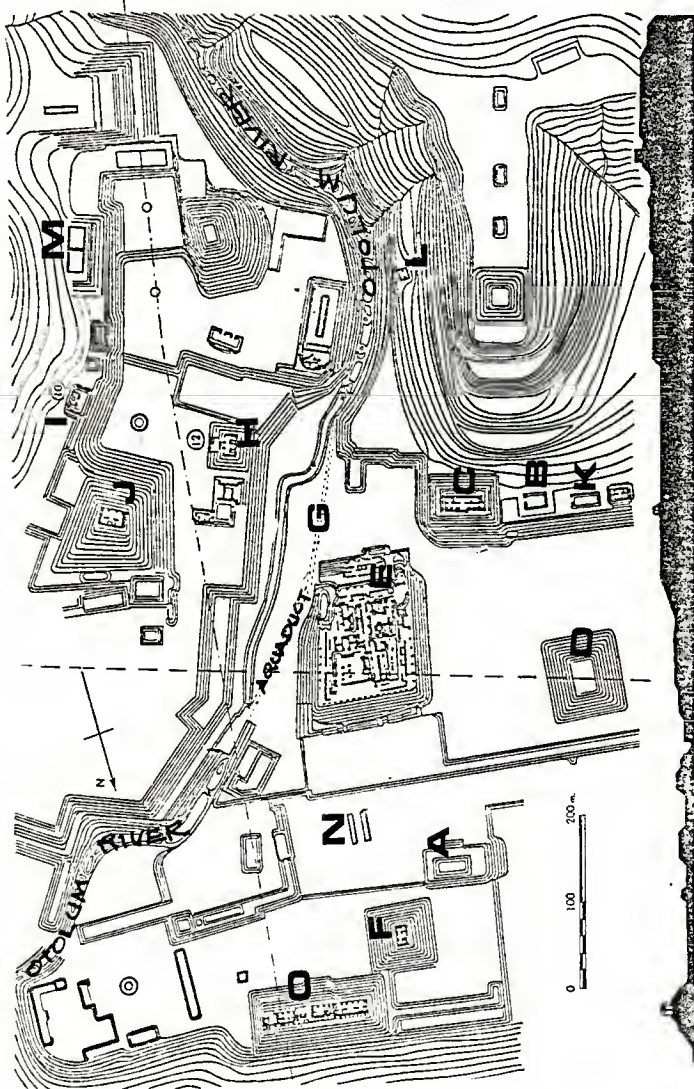
- | | |
|---------------|----------------------------------|
| 6th Cen. A.D. | Height of the city's prosperity. |
|---------------|----------------------------------|

Post-classic Period

- | | |
|----------------|---|
| 10th Cen. A.D. | The civilization ended, probably due to an invasion by people from the Gulf Coast. A short period of use by a more primitive tribe was followed by total evacuation until the 18th century. |
|----------------|---|

Major Features (Ill.#63)⁴⁰

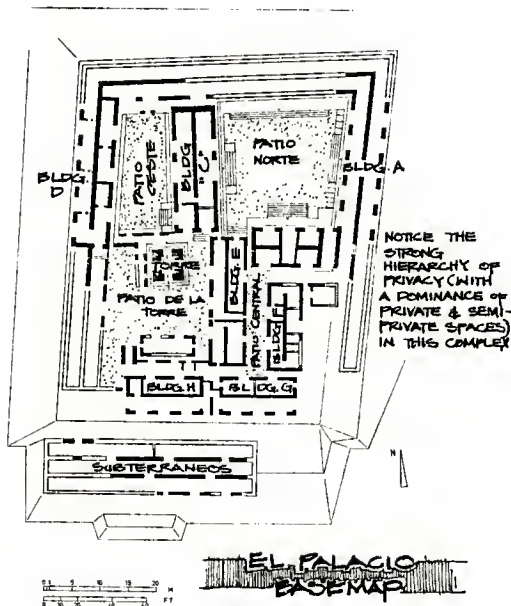
- A. Temple X
- B. Temple XIII (very little reconstruction; tomb found beneath the sanctuary; base attached to adjacent temples)
- C. Temple of the Inscriptions (tallest pyramid on the site; hieroglyphics and the famous crypt under its floor)
- D. Temple XI
- E. El Palacio (contains the unique observatory "Torre", or tower, galleries, residential size chambers, courtyards, and excellent stucco reliefs)
- F. Temple of the Count (three grave offerings, less the bodies; named for Baron Waldeck)
- G. Aquaduct (an ancient channelizing of the Rio Otulum using the Mayan corbeled vault)
- H. Temple of the Sun (with roof comb and roof base)



"BASEMAP OF PALENQUE"

Major Features (continued)

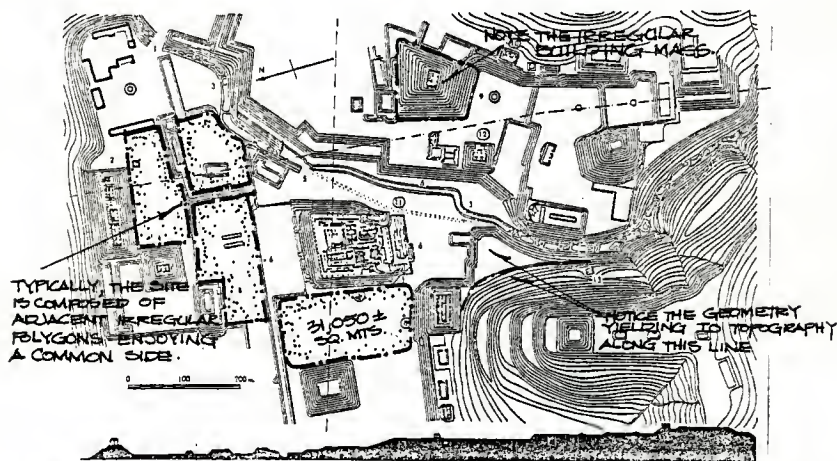
- I. Temple of the Cross (with typical roof comb and corbelled arch construction)
- J. Temple of the Foliated Cross (contains a relief that is almost identical to one found at Wat Angkor; again, with roof comb and corbelled arch construction that is typical of this city)
- K. Temple of the Skull (named for a stucco relief of the Death God; typical square chamber flanked by two half-chambers, with square openings in the front)
- L. Temple of the Jaguar
- M. Temple XVIIIa (contains a burial of an old man and two young women)
- N. Ball Court
- O. Northern Group



Applied Studies

Negative Space Study A greater diversity of shape is present in Palenque although its largest space is only 230 meters by 135 meters (31,050 square meters) in the plaza west of El Palacio. The more common size is closer to 10,000 to 20,000 square meters formed by irregularly geometric adjacent polygons enjoying common or parallel sides. These irregularly polygonal planes, or terraces, are predominantly angular; however, at the periphery of the reconstructed area adjacent to the hill mass or stream bed this shape becomes more rounded and organic to accommodate these natural features.

Topography demands terracing which automatically reduces the scale compared to Altiplano sites, but does not prohibit the continuity gained by the uninterrupted flow (or linking) of negative space on the site.

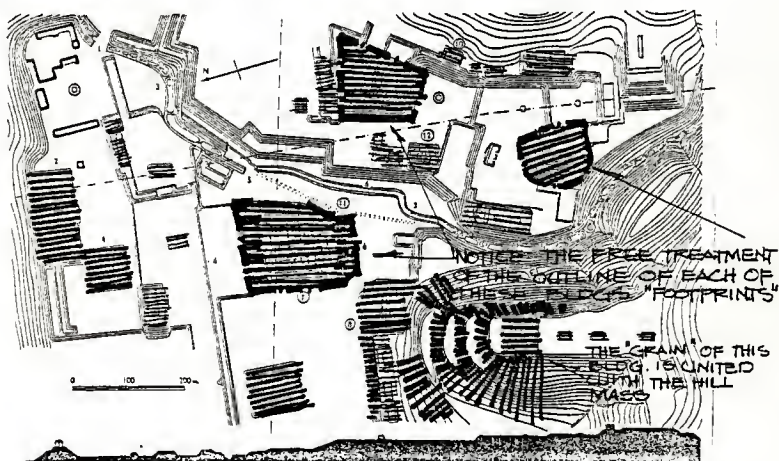


NEGATIVE SPACE STUDY

NOTICE THE GREAT DIVERSITY OF SHAPE (IN RESPONSE TO FUNCTION AND TOPOGRAPHY) COMPARED TO TEOTIHUACAN (BUT LESS VARIETY IN SIZE.)

There exists the maximum variety of size and shape still within unity. These irregular polygons (and occasionally building masses) are used as elements of transition from the organic periphery to the more geometric core. This irregularity is not very apparent at eye level since man makes mental images from a visual array that is strongly distorted by perspective and his own eye. It is a useful design lesson that the viewer can tolerate a good deal more irregularity than the young designer working in plan view on his drawing board.

Urban Fabric The most arresting difference between this site and the others studied is the assymetrical (or irregular) building masses. These "grains" do not vary as greatly in size as cities such as Teotihuacan. The largest is 80 meters by



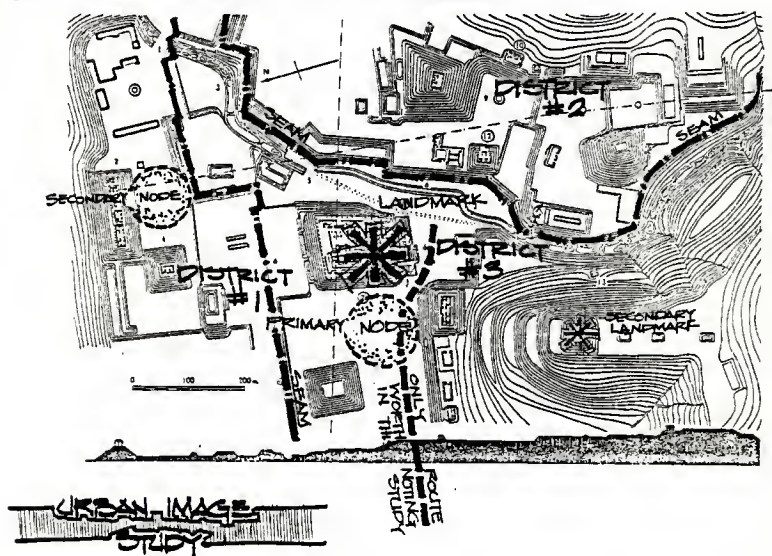
URBAN FABRIC STUDY

THOUGH LESS CHAOTIC AT GROUND LEVEL THAN IN PLAN VIEW, THIS IS STILL A VERY "LOOSE WEAVE" OF BLDGS IN THIS (URBAN) FABRIC WITH DIVERSE SHAPES (MORE THAN SIZES). THIS IS A PLAN TYPICAL OF INDIVIDUAL DESIGNERS ADDING EACH NEW (FUNCTIONALLY NECESSARY) PIECE WITHOUT AN OVERALL PLAN, BUT SENSITIVE TO THAT WHICH IS ALREADY CONSTRUCTED.

100 meters at El Palacio, although the more common size would be around 50 meters square.

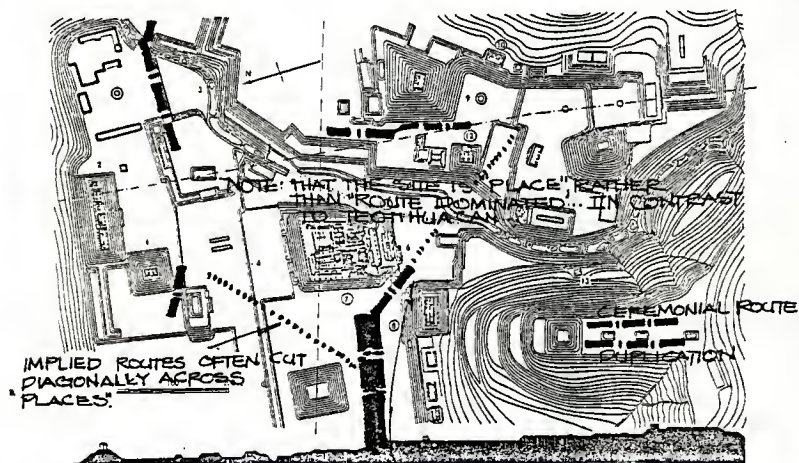
Generally the site is typified by coarse texture with a more loose, cellular, organic pattern than any other site visited. This may be due to a weaker central government and steeper slopes than are found at Teotihuacan.

Urban Image The undisputed landmark of Palenque is the famous "Torre" (tower) within El Palacio, with the apparently dominant node being located in the plaza just west of this complex. By adjacency and level changes the reconstructed portion of this extensive city can be divided into three districts: The upper area near the Temple of the Foliated Cross, the middle or main level at El Palacio, and the lower area near the Temple of the Count. Clear "seams" are not prominent, but the slope



or terrace edges between the levels roughly define the areas. The small stream reinforces the separation of upper and lower areas, but substantial subsurface drainage and stream rerouting has diminished much of this. This complex is dominated by "places" of medium size and irregular shape, rather than by "routes"; however, if a significant route must be mentioned it is the entry route which lies just north of the Temple of Inscriptions.

Circulation With the exception of the above route, the routes are very short and amount primarily to narrow points between places, usually about twenty feet in width. "Finger terraces" in route proportions and shapes are present. The only hierarchy apparent is implied by the widths of successive narrow points, and is not a dominant feature.



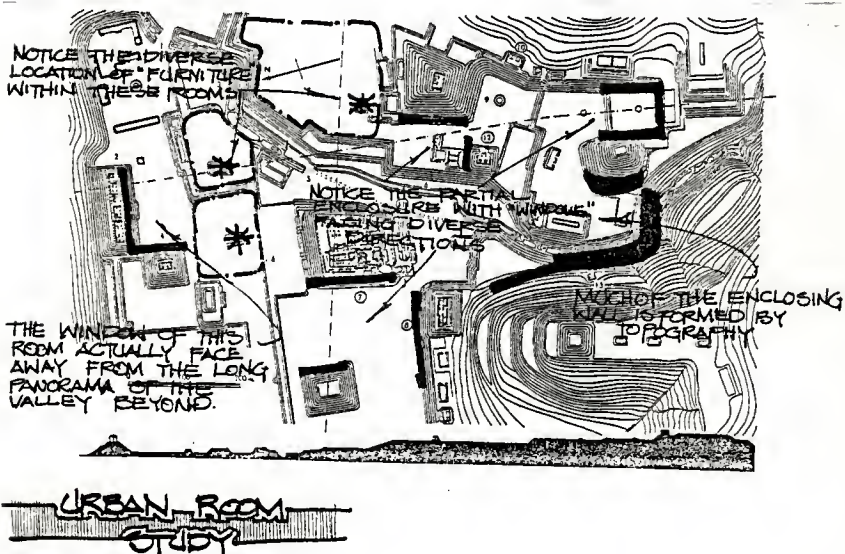
CIRCULATION STUDY

NOTE: THAT MOST OF THE "ROUTES" ARE SHORT & CONSIST MAINLY OF NARROW POINTS RATHER THAN LONG CORRIDORS.

The relationship of routes to places varies, but is almost never axial. Implied routes often are not perpendicular to terraces, but are diagonal to them. These slopes are consistent in width and are not used as transitional elements as are the "places", except when used as part of a building mass.

Due to the absence of fixed, or structured, routes the "places" offer the flexibility of either leisure or expedient circulation, but demand neither.

Urban Room Analogy Total (four wall) enclosure is unusual, but two and three wall enclosures facing in any direction (not necessarily outward toward toward the long view) are more common. The hill mass itself often forms much of this enclosure. Such walls have a considerable variation in "ceiling line", and wall height increases as one progresses up the slope.

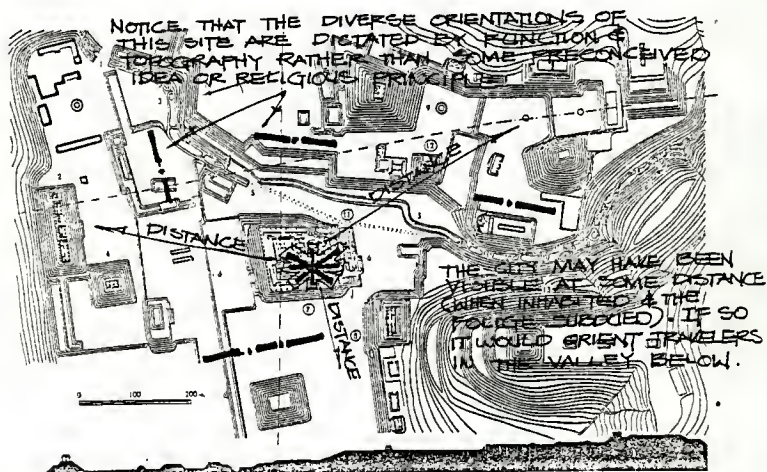


The placement of furniture varies greatly, suggesting placement by routes of pedestrian preference through the "places".

Existential Space While Xochicalco and Monte Alban have their centers on hill tops, and Teotihuacan is situated on a valley floor, this city center is on a hill side. True, so is Tzintzuntzan, and they are both north facing in their exposure. I speculate that this is consistent with the hot climate in the case of Palenque.

At the "macro" or regional scale this site is in very rough terrain, heavy jungle, and distant from the coast. Little wonder that it remained "lost" for so long.

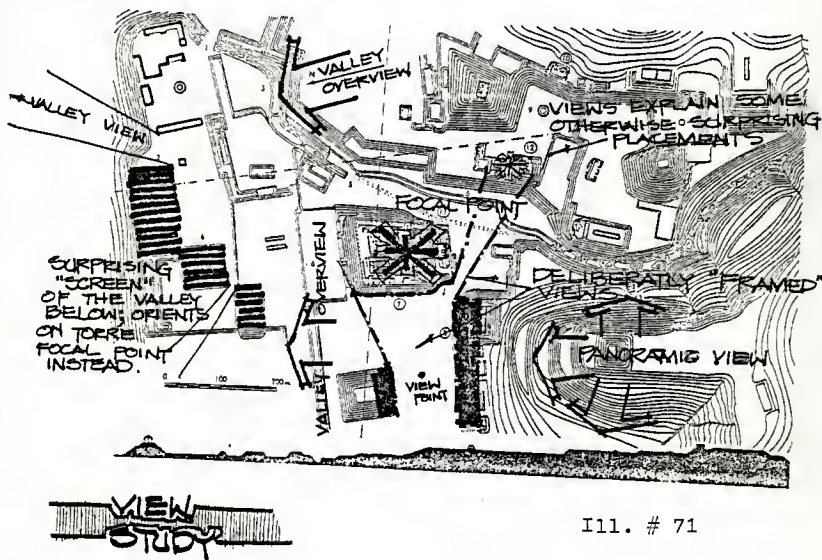
The buildings orient roughly north-south, but the "places" between them do not. This probably indicates that they responded to daily function, more than to some intellectual idea or goal.



EXISTENTIAL SPACE STUDY

A VIEWER'S SPATIAL POSITION IS ALWAYS UNDERSTOOD AS A "DIRECTION" & "DISTANCE" FROM THE "TORRE" IN THE CITY CENTER.

Isovists Study Enframent, segmenting, sequencing, and screening of views are all utilized in Palenque in great variety. The screening of the lower terrace from the long forty to fifty mile outwrd vista is the most unexpected. Some views exploit this potential, while others are as short as ten to twenty feet inside El Palacio. Phrasing of sequenced views is only loosely implied by terracing and route orientation changes due largely to the absence of strongly defined routes. The subject of this great variety in width and depth of view may be architecture, place, bas relief, or nature (e.g. the long valley vista, the Rio Otolum, or the jungle).



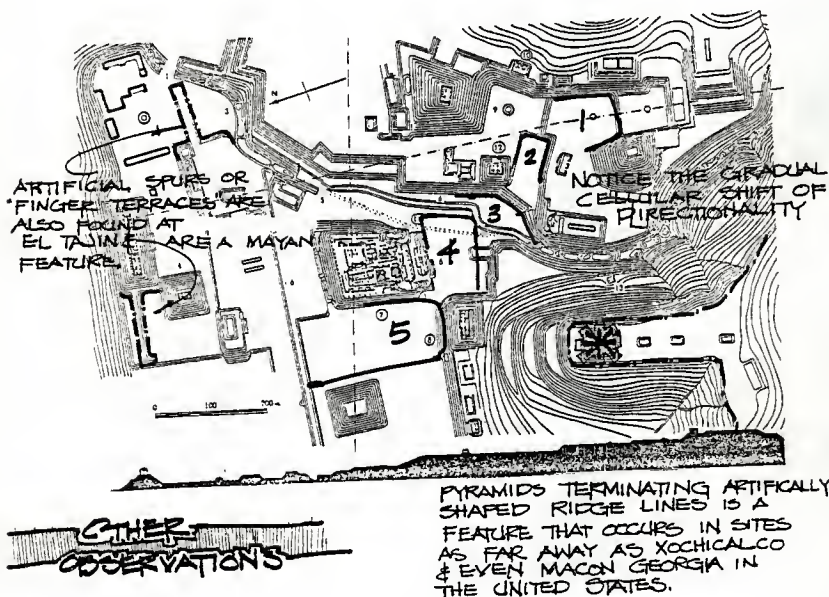
Ill. # 71

Miscellaneous Observations It is a common feature of Palenque that natural hill spurs are terminated by a pyramid, and that artificial spurs are added to man-made terraces. These features will appear again at Xochicalco and El Tajin.

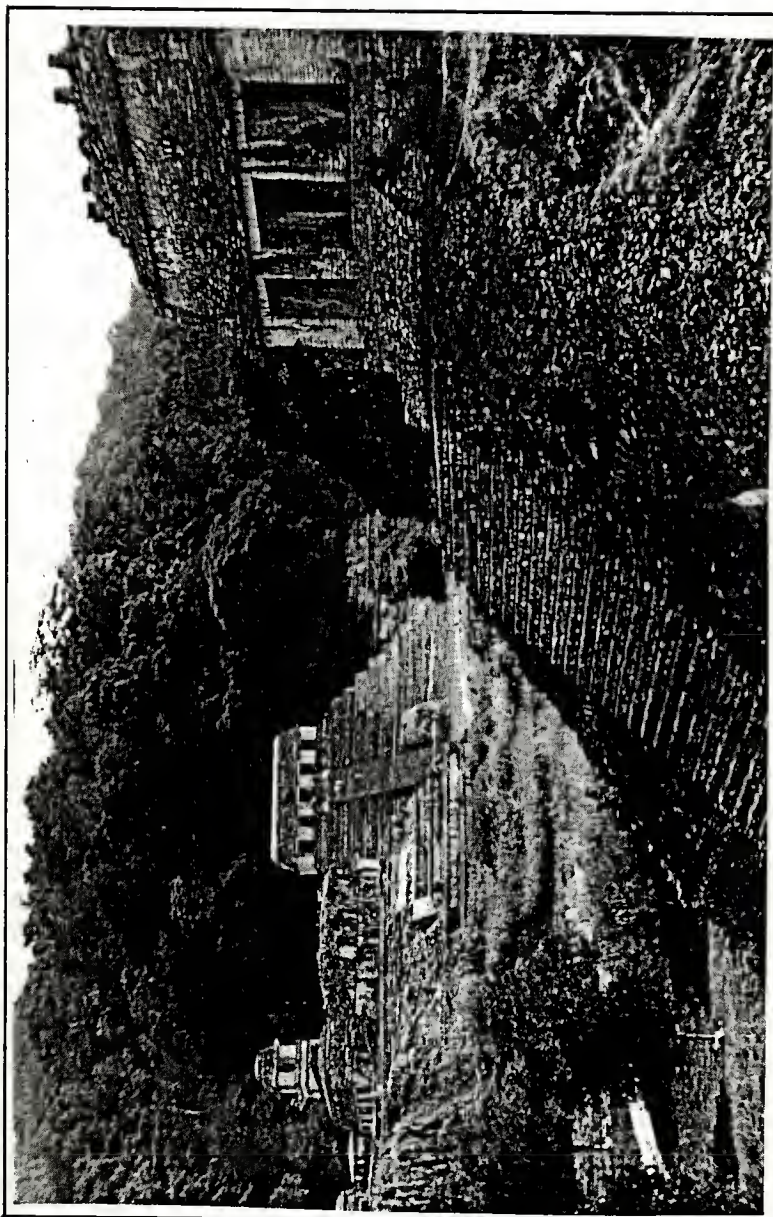
Basically this site's aesthetic composition may be described as an aggregation of cellular, irregularly polygonal

planes with common sides, and punctuated by occasional (but elegantly textured) architecture. In color value this architecture is a sharp contrast to the background jungle. The polygonal planes, or terraces, are used to accomplish changes of directionality, or the shift from organic to geometric behavior (Ill.#72). This, and the dominance of jungle foliage over mountainous terrain, make the character of this site very organic in comparison to other sites discussed, particularly Teotihuacan.

The elegance and detail of Mayan work is usually characterized as small and "jewel-like" compared to the brute size and power of Altiplano cities near Mexico City.



Ill. # 72



8

el tajin

Chapter 8

EL TAJINLocation

This Proto-Totonac city rests in the Gulf Coast area near present day Poza Rica, Veracruz, Mexico.

Site Description⁴¹

Several hundred unexcavated mounds cover the thickly vegetated, low coastal hills occupying an area of about 2500 acres. About 150 acres have been excavated. The zone is both hot and humid. Much of the near area is prone to flooding during heavy rains. Main roads and whole towns were closed of during part of my research in 1976, making travel difficult. Current transportation is based on a series of ferrys and bridges

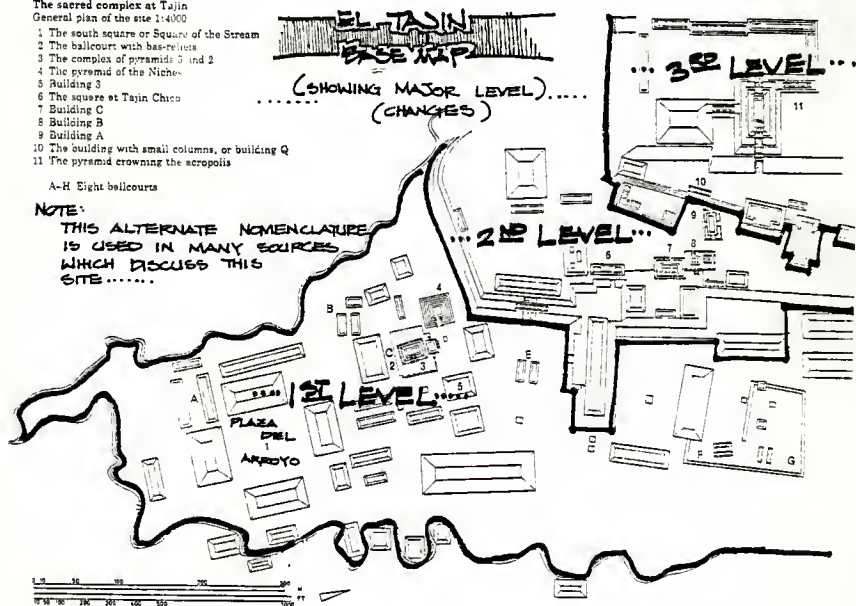
The sacred complex at Tajin
General plan of the site 1:4000

- 1 The south square or Square of the Stream
- 2 The ballcourt with bas-reliefs
- 3 The complex of pyramids G and 2
- 4 The pyramid of the Niches
- 5 Building D
- 6 The square at Tajin Chico
- 7 Building C
- 8 Building B
- 9 Building A
- 10 The building with small columns, or building Q
- 11 The pyramid crowning the acropolis

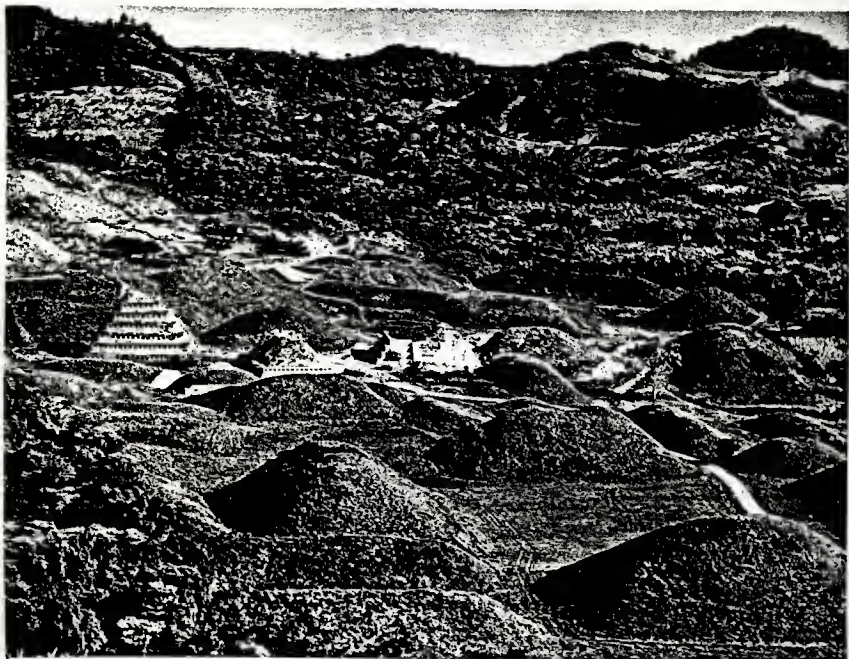
A-H Eight ballcourts

NOTE:

THIS ALTERNATE NOMENCLATURE
IS USED IN MANY SOURCES
WHICH DISCUSS THIS
SITE.....



all along this coastal region. Hardoy points out that this is an unlikely place for a major culture to evolve. The ceremonial center was built on three levels at the confluence of two small streams (Ill.#74). The oldest and lowest area near the confluence is level one. The middle level (about 15 meters higher in elevation) utilizes a low hillside to the north of the original site, and a more crudely constructed complex was finally built on the summit or third level of the reconstructed area. The middle level (level #2) is thought to have been constructed at the time of Tula. The elegantly detailed Pyramid of the Niches dominates the complex. Currently, the first level is thought to be the religious center, and the middle group (El Tajin Chico) to house civil functions. The Building of Columns on the artificially leveled hill top (25 meters above level # 1) is said to have contained ceremonial functions.



Major Features ⁴²

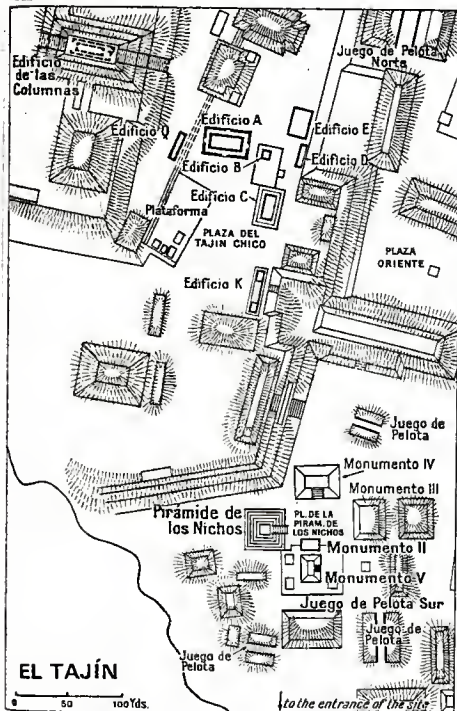
Juego de la Pelota Sur: (south ball court) with unenclosed ends and bas relief decorated walls depicting game oriented ceremonies.

Monumento V: Has double parallel stairs and three niches in the separating ramp on the lower mass; similar stairs without niches ascend the second, or upper, mass.

Monumento II: Another two part pyramid decorated on all sides with niches.

Pyramid of Niches: 117 foot square base by 65 feet high structure; contains 365 niches corresponding to the days of the year; one of the most exquisitely refined buildings in Mesoamerica.

Edificio C: "Talud-tablero" walls (see appendix ii).



"MAP OF MAJOR
FEATURES AT
EL TAJÍN"

Major Features (continued)

Edificio B: Contains two rows of three columns facing an interior space about 27 feet on a side.

Edificio A: A two-storey structure surmounted by stairs flanked by decorated ramps.

Edificio Q: Stands near a row of columns one foot in diameter supporting a tier cement roof. This was later infilled with masonry and only one door opening was left.

Edificio de las Columnas: A pyramid on a partially artificial hill mass; a series of four foot diameter columns bearing warrior decorations are at its base.

Edificio de los Tuneles: Contains two tunnels leading to a large court to the west of the monument.

Chronology⁴³

It is thought that this city followed a pattern of development roughly parallel in character to other classic cities such as Teotihuacan, but didn't reach its apogee until after that city's decline. Although the site was undoubtedly occupied much earlier, major archeological evidence supports the following:

300-500 A.D. Early Classic (Plaza del Arroyo developed)

500-900 A.D. Late Classic (This marks the height of the culture. The Plaza del Tajin Chico level developed.)

900-1100 A.D. Post-Classic (Final decline followed the development of the Edificio de las Columnas level)

Culture⁴⁴

The Olmec culture, beginning at about 1500 B.C. in the area of Veracruz and northern Tabasco, provided several influences on this culture. The ball game is perhaps the most obvious along with apparent influences in their art. The influence of Teotihuacan is also present prior to that city's decline. Toward the end of the classic period, Totonac influence began to spread

from Puebla to Cempoala. The strongest influence seems to have been from the Mayan culture. The most unique art object is the "yoke"(see app.1). Its use is as yet uncertain, but its elegance is universally accepted. The ball game was enthusiastically played, losers being sacrificed, and winners acquiring all of the spectators possessions as in the rest of Mesoamerica. Their pantheon of gods included the Fire God, Xipe, Tlaloc, and a smiling god among others. Tajin is the Gulf Coast equivalent of the highland god Tlaloc (rain god). It is thought that these may be the invaders of the Mayan area noted in the section on Palenque. The Danza de los Voladores (flying dance) is a unique ritual of this society, and is still performed at this site for tourists.

Archeological Efforts⁴⁵

- 1785 Site was discovered by engineer Diego Ruiz
- 1811 Visit by Baron Alexander von Humbolt
- 1836 Dupaix and Nebel visit
- 1934 Jose Garcia Payon finally partially excavated the city center (down forty levels, with more levels still below)

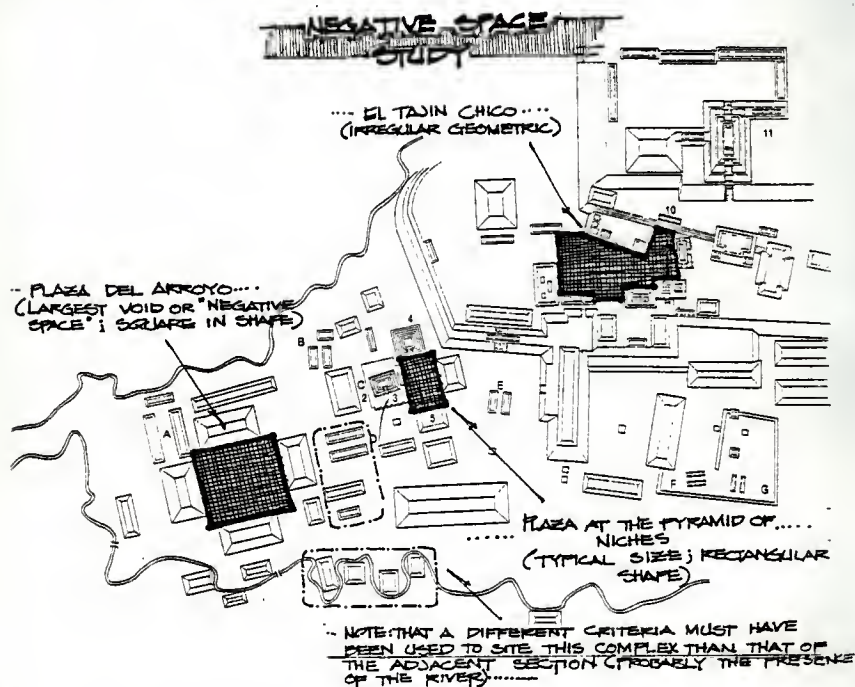
Applied Studies

Negative Space Study The variation of spaces at El Tajin is not as dramatic as in the others discussed thus far. The largest reconstructed space is the Plaza del Arroyo at 90 meters by 50 meters (4500 square meters), while the more common size would be in the 40 by 60 meter (2400 square meters) range. One example of such as space is the Plaza de la Piramide de los Nichos.

Three shapes dominate the spatial organization of the site: the square, the rectangle, and the irregular polygons (e.g. those near El Tajin Chico).

While purposefully formed spaces are apparent in level number one near the Plaza del Arroyo, this is not as apparent in other parts of the city. In these sections either the problem

of conservation of older structures arose, or a different criteria for siting was used (e.g. the temples locked in the coils of the small stream.



Ill. # 77

There exists a very substantial variation in proportion and shape, more than size, at El Tajin. This makes human scale much less of a consideration than at Teotihuacan or Monte Alban. The lack of overall spatial continuity, however, makes the orderly perception of a clear image of this city in the viewers mind very difficult. This unfortunate condition is augmented by the rolling terrain. The lack of spatial continuity is not as severe, however, as it would first appear from viewing just the city plan. The relationship of one group of buildings to the

adjacent groups, rather than to the total city plan, accounts for this continuity as one actually walks through the site. I speculate that this type of configuration results from a series of designers, or shifting emphasis in design criteria, without a single overall control or plan in contrast to Teotihuacan. It is not surprising to find that El Tajin flourished only after the fall of Teotihuacan. Spatial links mentioned above often flow into adjacent groups at odd angles.

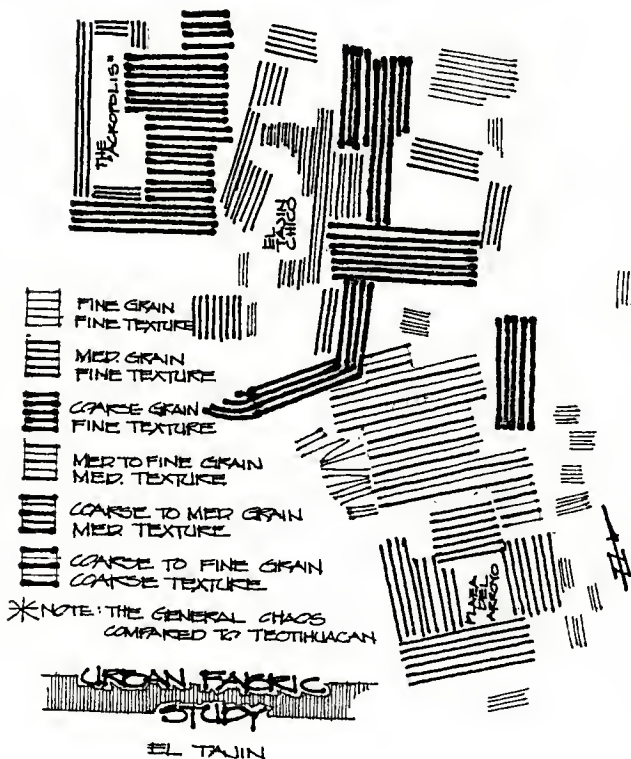
Urban Fabric In contrast with the irregularly polygonal hill and building masses of Palenque, this city's urban grains are predominantly regular rectangles with the occasional square being present. The largest grain would be the Temple of Columns at 60 by 100 meters (6000 square meters). This is not an impressive mass compared to other cities previously mentioned. The more common urban grain is about 30 by 40 meters (1200 square meters).

The texture that can result from such similar (and smaller) grain and space sizes can never be as coarse as those found in other cities. It might be termed as medium texture throughout, being only slightly more coarse at the upper of the three levels near the Temple of Columns (Ill.#78).

Perhaps the most revealing aspect of this type of study rests in the variation of patterns. Hardoy⁴⁶ emphasizes the existence of three levels. Level number one at the confluence of the streams is laid out on a north-south grid, but has many exceptions within it. Notice that other grid patterns in the city vary greatly in their orientation, yet rest only a short distance away. The middle terrace at El Tajin Chico is quite organic and responds more to slope, while acting as a transitional aesthetic element between the upper and lower levels. Hardoy reminds us that this was the second level constructed, chronologically. The upper terrace is on yet another grid orientation which is unsympathetic with that previously discussed on level number one near the Plaza del Arroyo. Such variations are not unusual in cities inhabited over a long period

since different values are used on each project; however, these variations are not as skillfully related here as we will see them handled at Xochicalco. It was probably just a lack of design awareness that led to this difference. Most of the design attention at El Tajin seems to have been directed at building design.

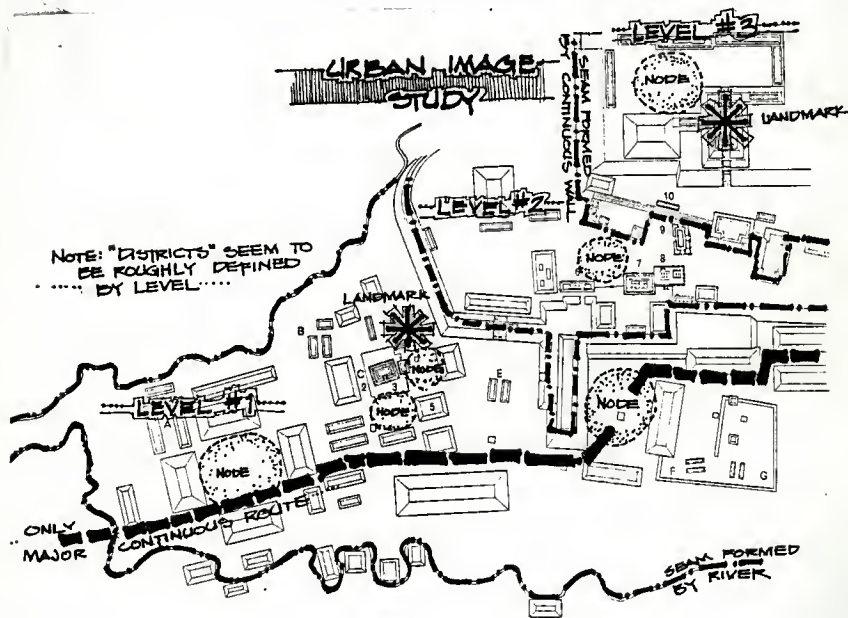
In order to make the variations in pattern more obvious the following overlay has had the basemap data removed and only one or two major features located in order to orient the reader.



Urban Image Assertive "landmarks" by size are not to be found here as at other sites, and are usually more the result of architectural excellence (e.g. the Pyramid of Niches), or by topographic position (e.g. The Temple of Columns).

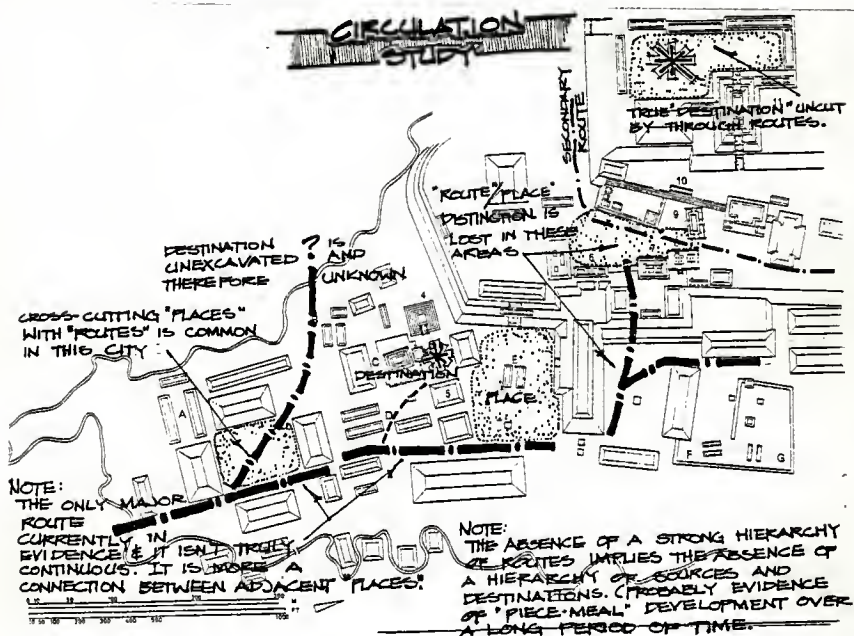
Similarly, no single dominating "node" is present. Instead several, almost equal sized, nodes are present. They seem to exist in every direction at about 150. to 200 meters from each other. Three of these nodes on the lowest level are linked by the significant route in the complex.

El Tajin does possess one of the clearest "seams" (e.g. the river) to be found in the cities researched. These seams are reinforced by the shift of pattern (Ill.#78) indicating the presence of different "districts". The Plaza del Arroyo area is one such district. At least four other such districts appear on the basemap, and generally coincide with the terrace levels.

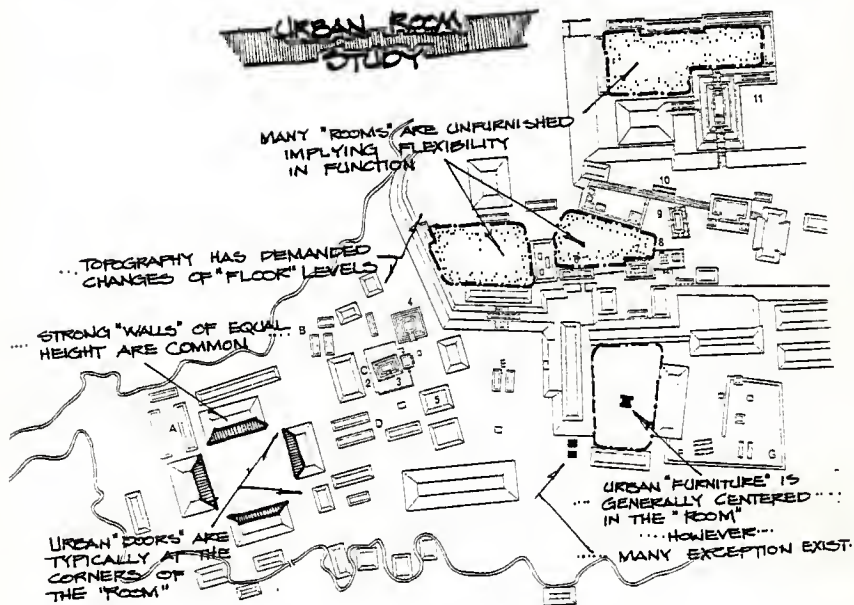


Circulation The longest apparently continuous route in the restored area runs about 600 meters before culminating in a "place" (Ill.#80). A consistent notion of hierarchy is not present, as this route varies arbitrarily from five to twenty meters in width. This and other shorter routes usually run across the edges of "places", though diagonal routes are also quite numerous. The latter tends to destroy the usefulness of the place by interrupting it with circulation. The El Tajin Chico area is an exception to this in that "route" and "place" are not distinct, but the route of probable preference runs again right through the the middle of this long polygonal plaza.

The total circulation scheme may best be described as a "net" of varied pattern, devoid of hierarchy, and expedient in its nature.

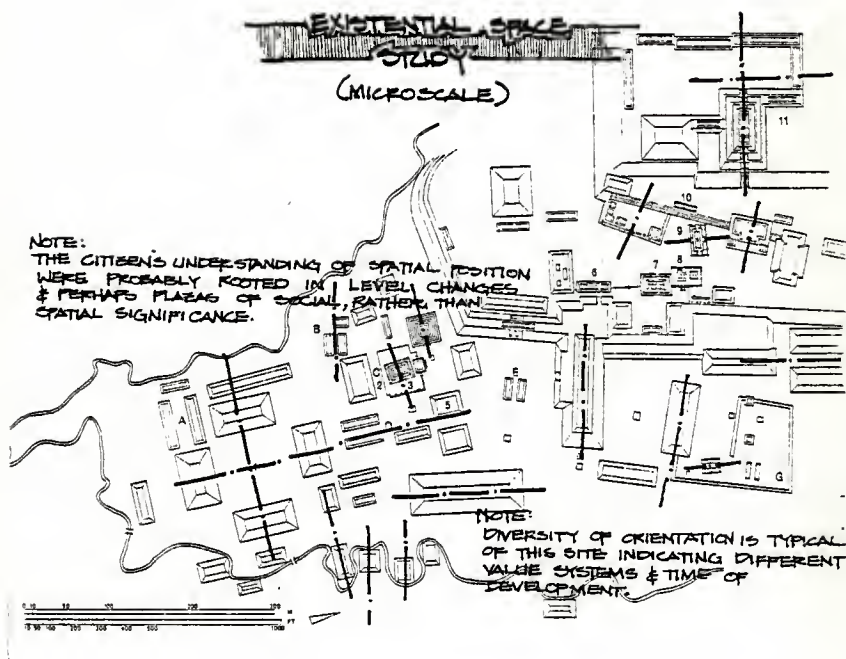


Urban Room Analogy Strong urban walls exist throughout providing total enclosure as the common condition. Openings to adjacent rooms normally occur at the corners. Floor levels vary by building group, rather than by "room". The ceiling line varies only moderately, and is not used to emphasize topographic changes as at Palenque. "Furniture" is typically centered in the room, but there are a great many exceptions.



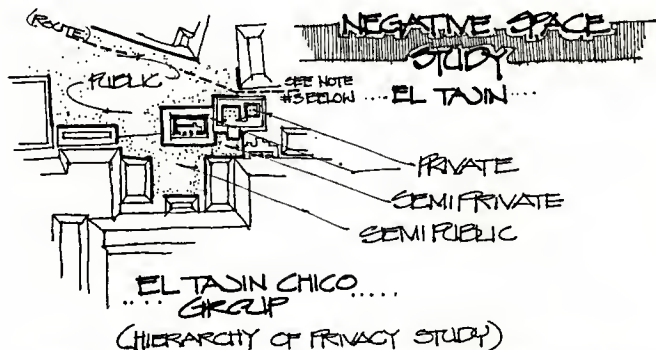
I11. # 81

Existential Space With respect to other cities of the Classic Period, El Tajin lies on the periphery of the Teotihuacan sphere, just as did Tula and Xochicalco. These cities also flourished after the fall of Teotihuacan (I11.#11). It rests in an unlikely agricultural and trade position, in a zone not favorable to human comfort. At the micro scale, the multitude of orientations is an enigma (I11.#82).



Ill. # 82

Privacy Study For all of its irregularities, this city seems to have respected the sequence of privacy more than most. The transition from public, to semi-public, to semi-private, to private in the El Tajin Chico area is absolutely consistent with modern theory (Ill.#83). Further, the city seems to be zoned by conventional urban uses. Residential and religious uses are further separated by level changes, not just by horizontal grouping. The layout of El Tajin suggests that concern for the individual is more important than in its contemporary Teotihuacan. In this aspect it is geographically and spatially a transition from the extreme exercise of individual freedom found to the north at Tamuin, and the extreme order and social discipline of the Altiplano cities.

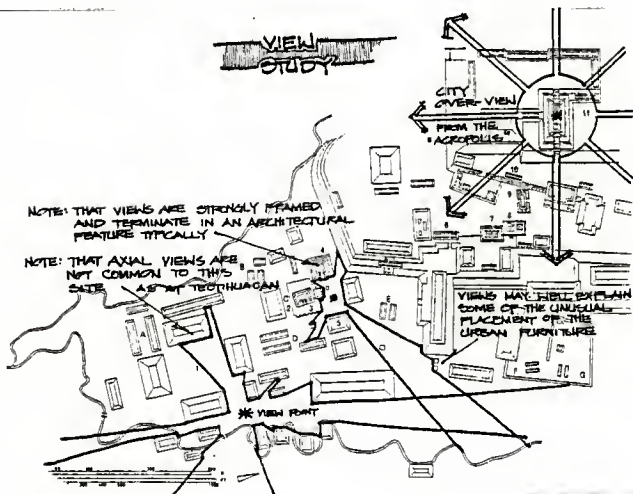


* NOTE: 1) THE LOGICAL PROGRESSION FROM PUBLIC TO SEMI-PUBLIC, TO SEMI-PRIVATE, TO PRIVATE SPACES.

2) THE DIVERSITY OF SHAPE IN THESE SPACES WHICH IS TYPICAL IN THIS CITY.

3) THAT THE IRREGULAR "PUBLIC" SPACE SHOWN IS PROBABLY THE RESULT OF A ROUTE OF PEDESTRIAN TRAFFIC ACROSS THE PLAZA (SHOWN BY DOTTED LINE).

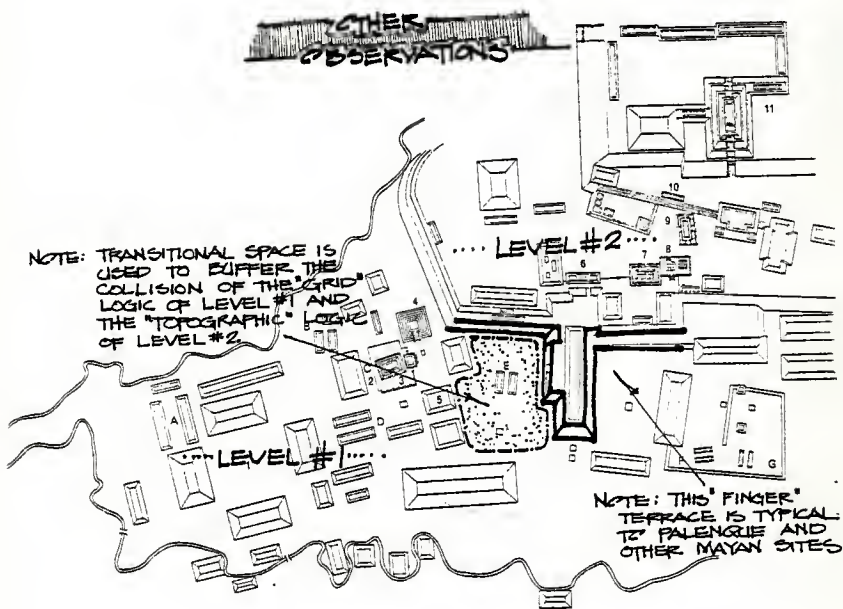
Ill. # 93



Ill. # 84

Isovists Study Some use of a panoramic city overview is made at level number three (Ill.#83). Generally views are strongly framed, non-axial, 50 to 100 meter long exposures to architectural subjects. Segmenting is not practiced, nor would it be relevant in this rolling terrain since it is normally employed to add meaning or variety to an excessively consistent panorama (e.g. the ocean).

Miscellaneous Observations Notice that "finger terraces" are present here as they were at Palenque, but they do not seem to be intended for use as a route as they were at Palenque.

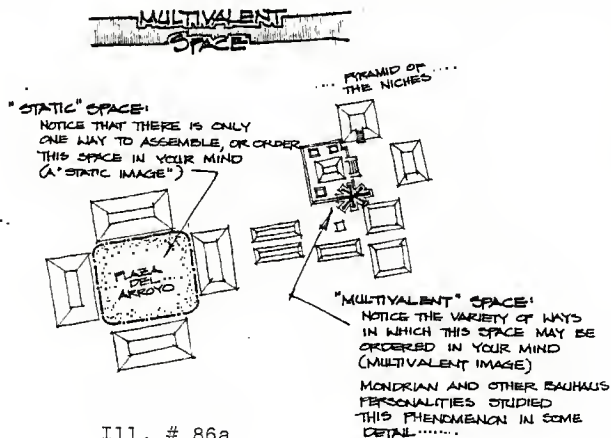


Ill. # 85

As an aesthetic composition El Tajin may be described as nearly devoid of a focal point, but is rather of nearly equal texture and interest throughout. No overall logic emerges from the composition, so it makes more sense in its parts than in its

whole. Texture is its dominant aspect, with the only strong continuous line being the terrace edge of the middle level. This organic line conforms to, and reveals, the topography but is poorly related to the Arroyo Group below. The composition is fraught with apparently meaningless exceptions throughout. This aesthetic disorder probably served the vital changing functional needs of these people quite well. Indeed, a comparison to the Greek Agora mystery⁴⁷ may be made in which Bacon unraveled the apparently random distribution of very symmetrical building in space. He discovered that the functional circulation gave meaning to that "random" complex. Given a greater insight into the uses and life style of these people, a similar rational might be found at El Tajin; however, it is unlikely that an one rational would account for these variations.

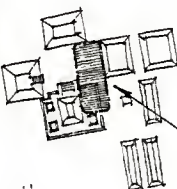
A final observation in the use of transitional space which characterizes this city is its overlapping associations with adjacent shapes. An example may be found in the offset plazas near the Pyramid of the Niches where three overlaying rectangles in negative space are implied by its enclosure. This adds considerable interest to this plaza, more certainly than can be found in the compartmentalized Plaza del Arroyo.



Ill. # 86a

IMAGE #1

FRAMING OF THE NICHES



NOTICE: THAT THE REFERENCE POINT HAS BECOME PART OF THE THIS RECTANGULAR SPACE (WHICH IS VERY APPARENT AT THE SITE BUT IS ONLY SUGGESTED BY THIS PLAN VIEW DRAWING).....

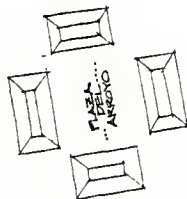
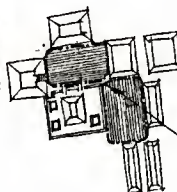
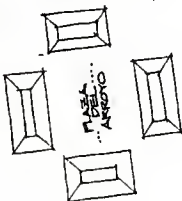


IMAGE #2

FRAMING OF THE NICHES



NOTICE: THAT IN THIS PERCEPTION THE REFERENCE POINT HAS REINTEGRATED AS PART OF TWO ADJACENT RECTANGLES WHICH ARE VERY OBVIOUS IN THIS PLAN PROJECTION.....

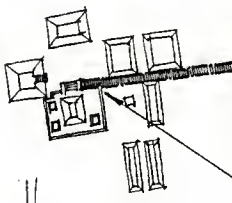


"MULTIVALENT SPACE"

Ill. # 86 b through e

IMAGE #3

FRAMING OF THE NICHES



NOTICE: THAT THE REFERENCE POINT IS NOW PART OF A NARROW CORRIDOR OF SPACE RUNNING ROUGHLY EAST-WEST.....

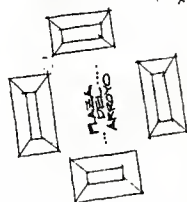
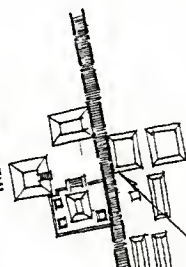
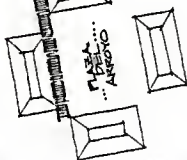


IMAGE #4

FRAMING OF THE NICHES



NOTICE: THAT FINALLY THE POINT HAS BECOME PART OF A "SHAFT" OF SPATIAL CONTINUITY WHICH JOINS THE TWO ADJACENT PLACES TO THE PLAZA DEL ARROYO. THE EXAMPLES OF "MULTIVALENT" (MULTIPLE MEANINGS) AND SPATIAL CONTINUITY OFFER PROFOUND LESSONS FOR THE STUDENT OF SPATIAL DESIGN.....



Multiple meanings from a single visual array (multivalence) are more easily developed in negative space than in building masses. This technique was used in the famous Piazza San Marco in Venice, and is a phenomenon extensively studied at the Bauhaus in Germany by both architects and painters.



"El Tajin Chico"

Ill. # 87

9

xochicalco

Chapter 9

XOCHICALCOLocation

Just south of Cuernavaca in Morelos, Mexico rests the ruin of Xochicalco ("place or house of flowers").

Site Description⁴⁷

The ceremonial center is sited on an artificially flattened and terraced hill top at an elevation of about 5000 feet, formed by a spur of the Ajusco volcano. The hill rises some 130 meters above the plain. The developed area is approximately 1300 yards from north to south, and 800 yards from east to west. It has a commanding view on all sides of the valley below, and the mountains beyond (Ill.#88).



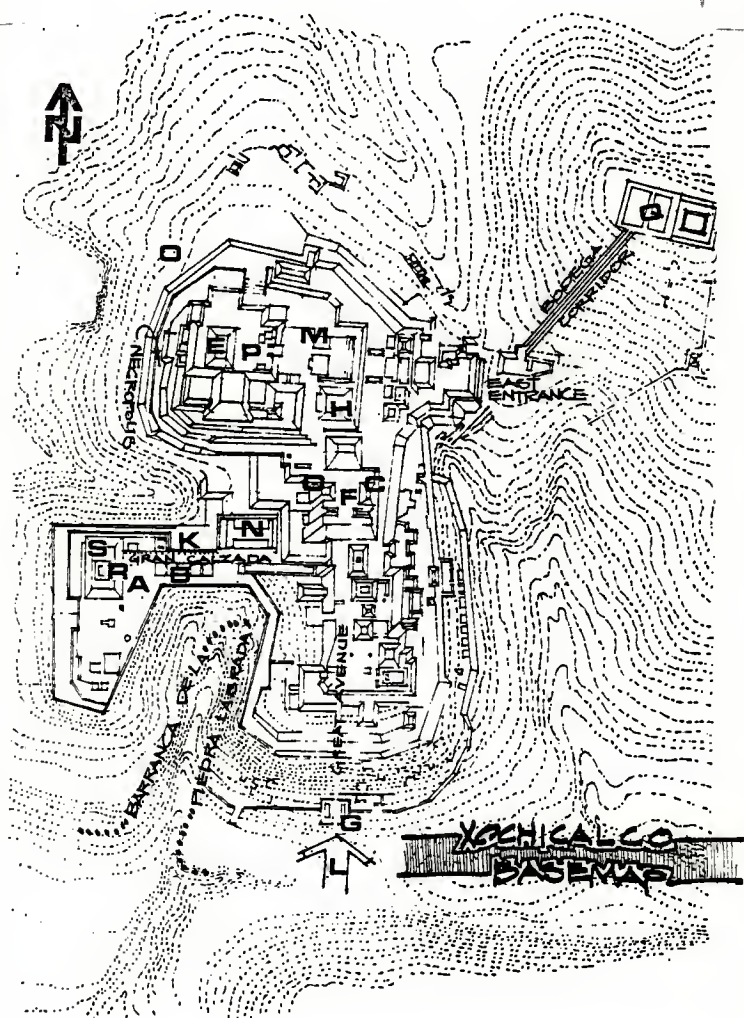
"AIR PHOTO OF XOCHICALCO"

Ill. # 88

Due to the altitude, cold winters are present here as in nearby Mexico City. Therefore, while the climate is generally mild real shelter is necessary. Topography has taken precedence over climate in this city, however. This is proven by the development of all exposures of the hill. The mountain Sierozem soils and twenty inches of annual rainfall make raising the all important maize crop possible (both in the past and now) on the level high plateau surrounding this hill top city. Winds do not seem to have dictated the urban form of Xochicalco in any significant way.

Major Features⁴⁸ (Key to Ill. # 90)

- A. Edificio A
- E. Edificio B
- C. Building C
- D. Building D
- E. Summit Pyramid (unexcavated)
- F. Plaza Inferior
- G. South Gate of the City
- H. Building A
- I. Bodega Corridor (Mayan type corridor to Q, the Bodega)
- J. East Entrance to the City
- K. Row of Monuments or Alters (coincides with the twenty month calendar)
- L. Great Avenue (Camino Sur)
- M. Temple of Quetzalcoatl (most famous building at the site; has both Mayan and Teotihuacan reliefs)
- N. Pelota Court (almost identical with the courts at Tula and Copan in dimensions)
- O. Los Amates Cave Entrances (artificially enlarged natural caves)
- P. Summit Plaza



Chronology⁴⁹

Most sources avoid an attempt to chronical this city's evolution. Pentison⁵⁰ notes, rather conservatively, that it was occupied from the Preclassic Period onward through the Toltec era. This would be from about 300 A.D. to 1200 A.D. with a development parallel to El Tajin. While no concrete evidence currently confirms it, I speculate that the presence of many natural caves makes this a logical site for very early (even archaic) habitation, and might account for its establishment on this particular hill top. This hill is not the most easily defended, the closest to water, nor unique in its orientation. Extensive reshaping of the natural caves might have removed such earlier evidence. However, placing speculation aside, refer to El Tajin for a similar historical evolution in which Xochicalco flourished after the fall of Teotihuacan.

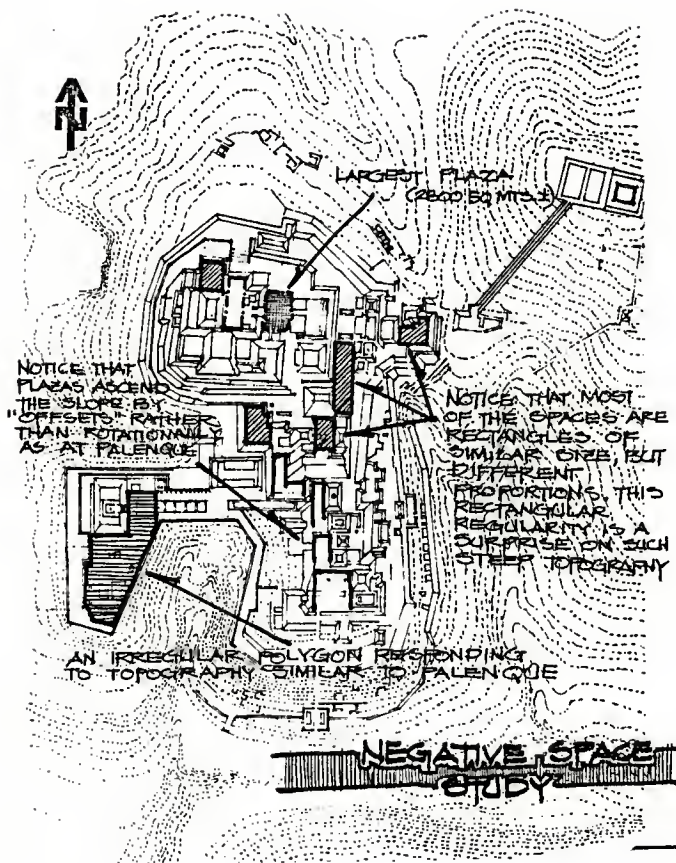
Culture⁵¹

The most intriguing aspect of this society is its clear similarity to Mayan culture. Influences of Toltec, Nahua, Zapotec, and Gulf Coast cultures are present; however, very little of the anticipated Aztec and Teotihuacan impact can be found.

Since Teotihuacan existed in the same time frame, and is only seventy miles away, this is extraordinary. Perhaps they were competitors. By city plan, they are similar to Yaxchilan (see app. III); in art and pottery to central Veracruz, Zapotec, and Toltec; in their ball game to Copan and Tula; and in architecture to the Maya. These similarities suggest a "melting", or composite culture.

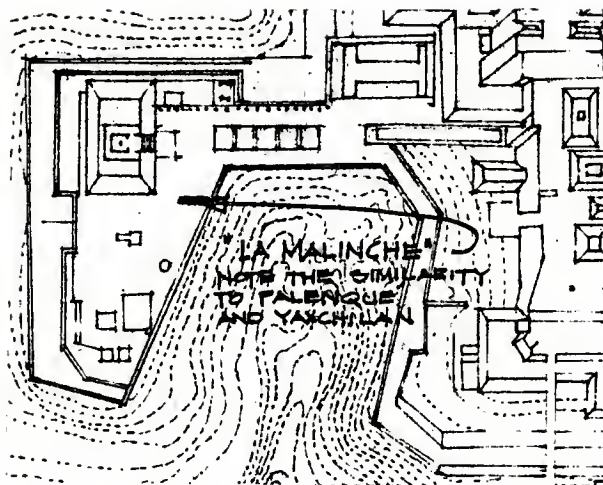
Applied Studies

Negative Space Even the largest space at Xochicalco is a modest 70 by 40 meters (2800 square meters) at the Plaza of the Temple of Quetzalcoatl. Indeed there are many plazas of this same small size; however, this measure is deceptive since these modest plazas are associated with panoramic outward view.



I11. # 91

Rectangular open spaces abound in a considerable variety of proportions. A few "places" such as that which terminates the Malinche spur (I11.# 92) are irregular polygons, but this is clearly the exception rather than the rule. This is unexpected on topography that is this rough. The use of irregularly polygonal terraces at Palenque seems a more probable solution based on solutions in other mountainous parts of the world.



"LA MALINCHE"

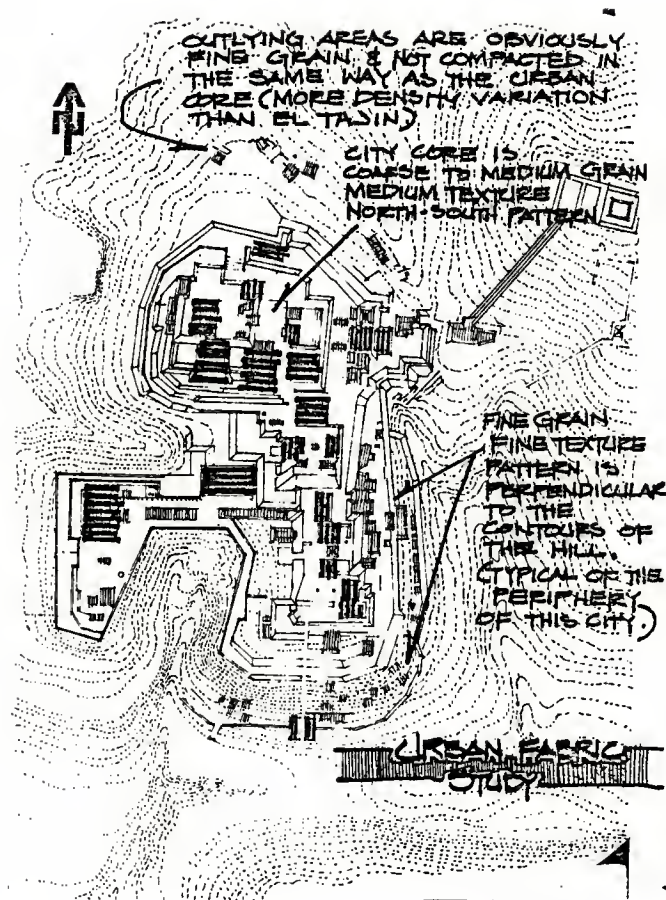
Ill. # 92

Due to their limited size, the open spaces present little or no problem with respect to human scale. A clear hierarchy of place sizes can be identified as one moves from the "route" dominated South Entrance through a carefully handled transition to the "place" dominated summit.

Notice the similarity of the Palacio on the La Malinche spur (Ill.100) and that at Palenque (Ill.#64) where a thickened masonry mass even suggests the possible presence of the unusual "Torre", or tower.

The rectangular plazas descend the slope by offset axis, rather than rotationally as at Palenque.

Urban Fabric "Grain" sizes are also modest both in mass and in variation when compared to other Altiplano sites. The largest is the Malinche Temple Mound at 60 by 90 meters (5400 square meters), while the common size is about 30 by 30 meters (900 square meters). The buildings forming these grains are regular rectangles, some of which are square. In contrast to El Tajin the negative space design is of equal or greater concern than the buildings themselves.



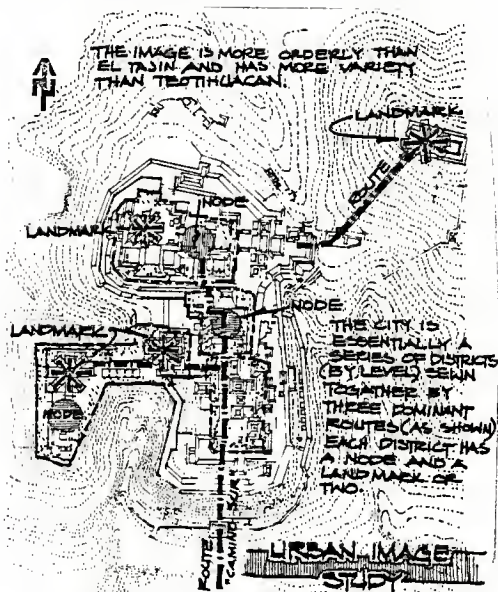
I11. # 93

The texture becomes more coarse as the development nears the summit of the hill, but could never become as coarse as at Teotihuacan due to the limited grain size.

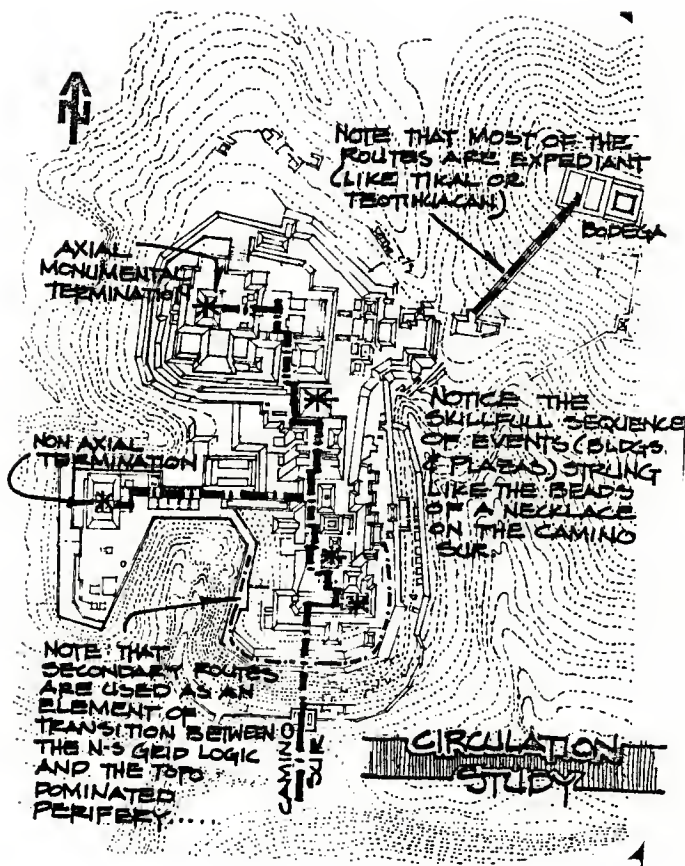
A definite attempt to stay as close as possible to a north-south axis has been made, with the obvious exception of the Bodega. This pattern "softens", or shifts, gradually to a more organic shape at the periphery of development where topography

has its way (Ill.#99). Routes are used in the periphery as an element of transition, therefore, between contour and north-south axis logic compared to "place" and building transitions at Palenque. I speculate that this pattern is typical of sensitive individual designers supporting adjacent designer's work over a long period of habitation (similar to El Tajin), but always with an eye on the whole city (which did not occur at El Tajin).

Urban Image The summit, the Temple of Quetzalcoatl, and the Pelota Court are the apparent "landmarks" when visiting the site. The Plazas associated with them were the likely "nodes". The best example of a "district" is La Malinche which, as the topography narrows at the Pelota Court, forms a "seam". This seam is reinforced by the level change necessary to ascend to the Camino Sur. The Gran Calzada and the Camino Sur are the best examples of "routes" (Ill.# 94).



Ill. # 94



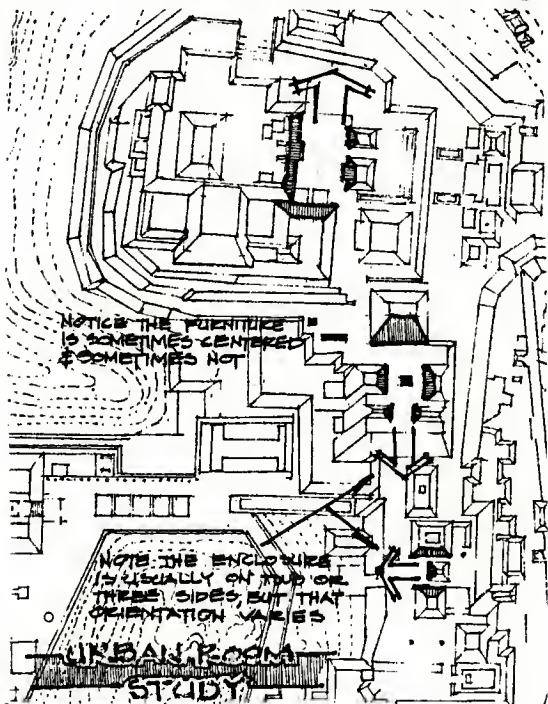
I11. # 95

Circulation Study In contrast to the other hill top village of Monte Alban, routes play an important role in Xochicalco's organization. The Camino Sur (Great Avenue) strikes directly, expediently up the hill toward the summit complex. This would be normal on a level site (e.g. Teotihuacan), but is unusual on this slope. It isn't grandeur, but rather skillful temporal phrasing (as in music) that made this site the most sophisticated urban design visited during my Mesoamerican research. The sequence of events and views are clearly deliberate.

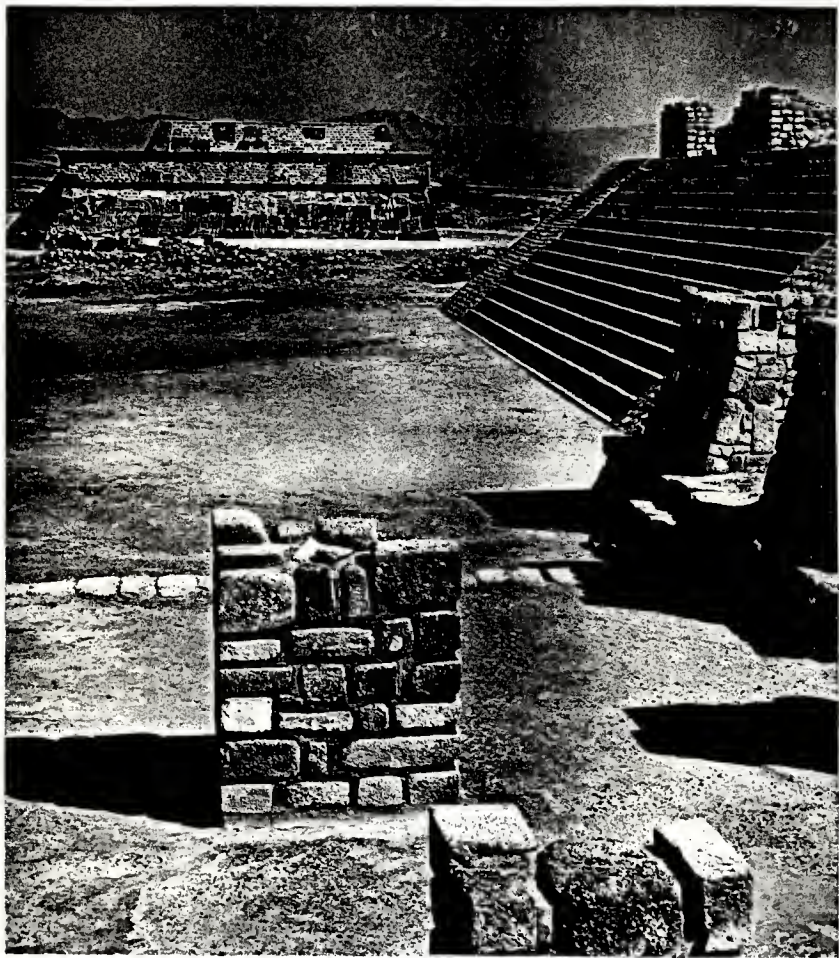
The length of the Camino Sur is about 600 meters, and gradually broadens from eight meters at the South Gate to twenty meters at the summit complex. Routes generally broaden into places gradually (e.g. Plaza Inferior), and run along one edge where possible. At only one point on the Camino Sur does it arrive at a terminating monument axially. Normally the route approaches such monuments in a manner more consistent with Mayan practice.

The direct, expedient Bodega Causeway is quite similar to Tikal and Chichen-Itza (see app. iii); however, these are both low, level sites making the route unusual across this saddle.

The location of monuments along the Gran Calzada is reminiscent of Yaxchilan, which is a Mayan hill village.



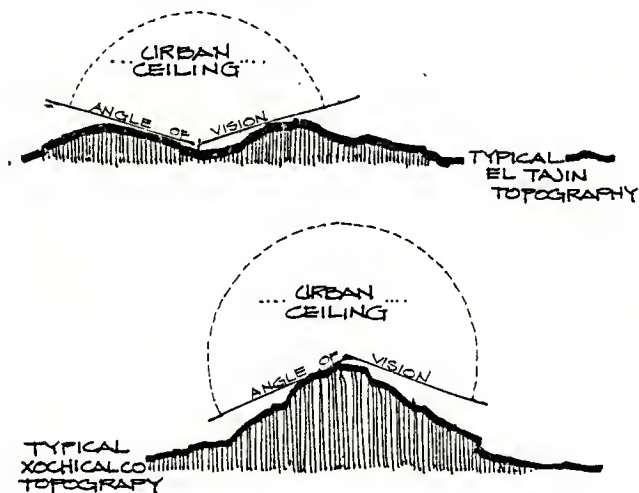
Urban Room Analogy Adequate enclosing walls in juxtaposition with outward directed views characterize Xochicalco. Enclosure on four sides is exceedingly rare on this site, but the missing wall, or walls, do not face a consistent direction. (Ill.#96).



"TEMPLE OF QUETZALCOATL" at the summit complex

Ill. # 97

The hill top site makes the sky the urban ceiling, and it is enormous in comparison with El Tajin.



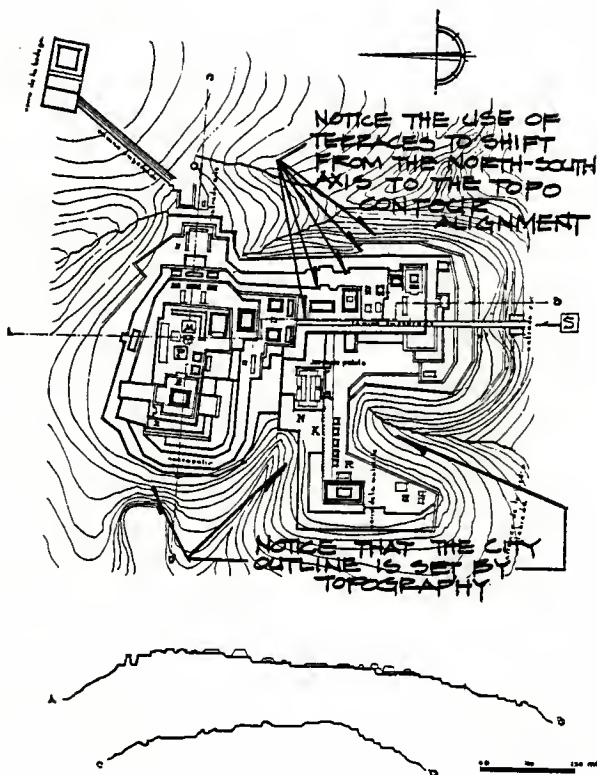
"XOCHICALCO: URBAN CIELINGS"

Ill. # 98

The rectangular floors of these rooms that form overlapping planes with offset axis. Furniture is sometimes centered, sometimes offset, but typically respects the north-south axis.

Existential Space At the macro-scale Xochicalco's position is similar to Monte Alban in that it is a hill top site; and contrasts with Teotihuacan which is a valley site, Palenque which is a hillside site, and El Tajin which flows over low rolling hills. This site choice is, therefore, more Mayan than one would normally expect in the Altiplano area.

At the micro-scale the subtle transition, or shift, away from the north-south axis as one moves from the summit to La Malinche is gradual and unnoticable on the ground (Ill.#99).

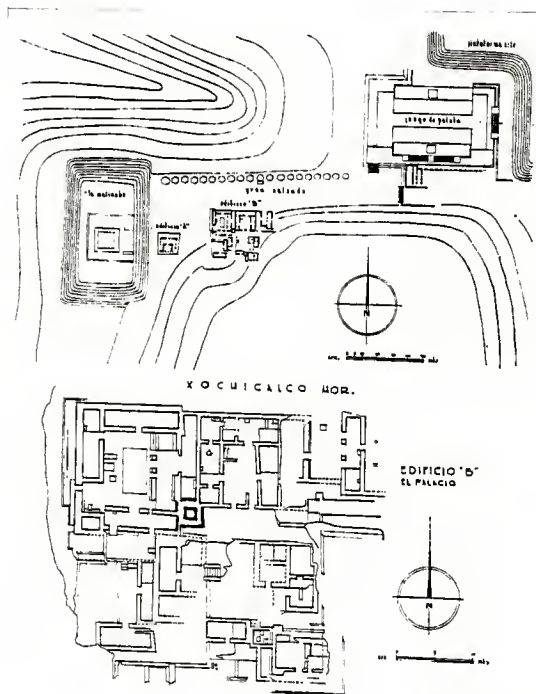


"ORIENTATION SHIFTS"

Ill. # 99

Privacy Study In the sequence, or hierarchy, of privacy El Palacio at Palenque and Xochicalco show many similarities (Ill.# 64 and 100). While both progress from public, to semi-public, to semi-private, to private as expected; the semi-public space seems small in both. These spaces are actually contained within each complex, rather than as a forecourt as at El Tajin Chico (Ill.#83). The "Torre", if one did indeed exist at Xochicalco, is in a similar position within the Palacio complex to

that found at Palenque, once again suggesting a strong cultural tie to Mayan design.

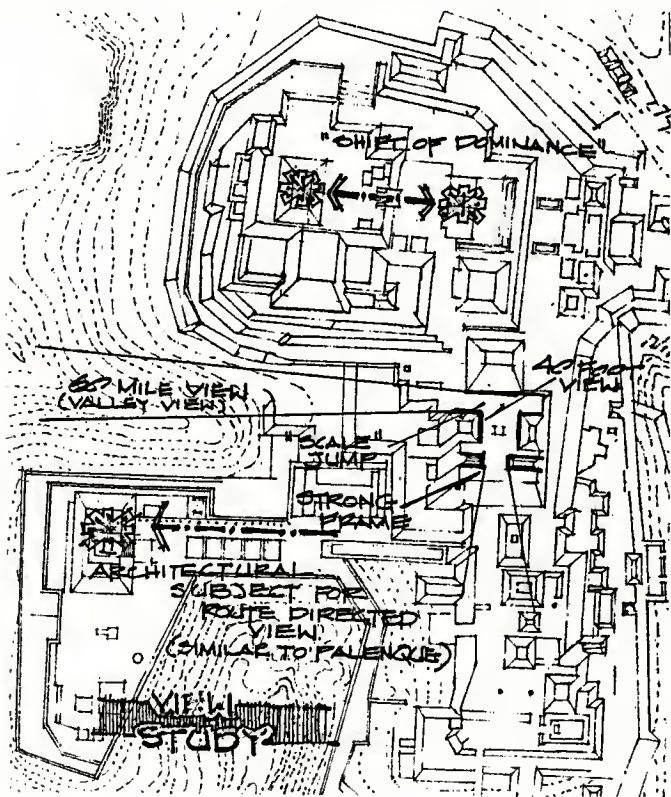


"EL PALACIO"
Ill. # 100

View Study If Teotihuacan has grandeur in its overall simplicity based on a single great logic, and if El Tajin has the interest given by variety (but lacking in order), surely Xochicalco is easily the most satisfying to the contemporary designer. Its exploitation of views by sequencing, enframing, and screening must be without equal in Mesoamerica.

The shift from a near screening urban wall to a strongly enframed view of sixty miles produces a tremendous scale jump, and is quite common in this city. Such a sequence, or shift, is

is not accidental because the shift in route orientation demands that the viewer experience the event. This passes for very sophisticated temporal design among contemporary designers. Terraces, enclosures, and shifts of route accompanied by view exploitation are the typical phrasing (as in music composition) tools used at Xochicalco. The subject of these views typically alternates between architecture, and the valley below. This is true even when ascending the hill, which is unusual. It is interesting to speculate on the designs that these people might have evolved given a site with the natural beauty of Tzintzuntzan.



Miscellaneous Observations In addition to the preceeding aspects several other observations deserve attention. First, the courtyards appear to have been sized by cone-of-vision as well as function. Second, are the skillful shifts of dominance not just in the overall scheme of the city, but also in the details. Finally, there are carefully constructed overviews to summarize route sequences.

NOTICE THAT THE
APPROACH SEQUENCE
OR "CRESCENDO"
CULMINATES ON THE
SUMMIT AT "J".

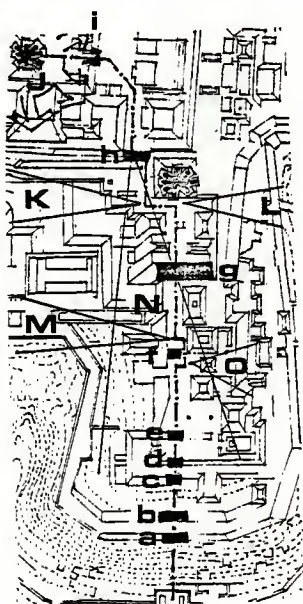
NOTE THE SUMMARY
OVER VIEW OFFER
AT "J".

NOTICE THAT VIEW
"N" INTRODUCES THE
EXIT SEQUENCE

VIEWS "K", "L", "M", AND
"O" ARE DEMANDED
BY ROUTE DIRECTION

TERRACE EDGES
FORM "PHRASING"
LINES IN THE
CAMINO SUR
SEQUENCE.
(SEE "3" THRU "1")

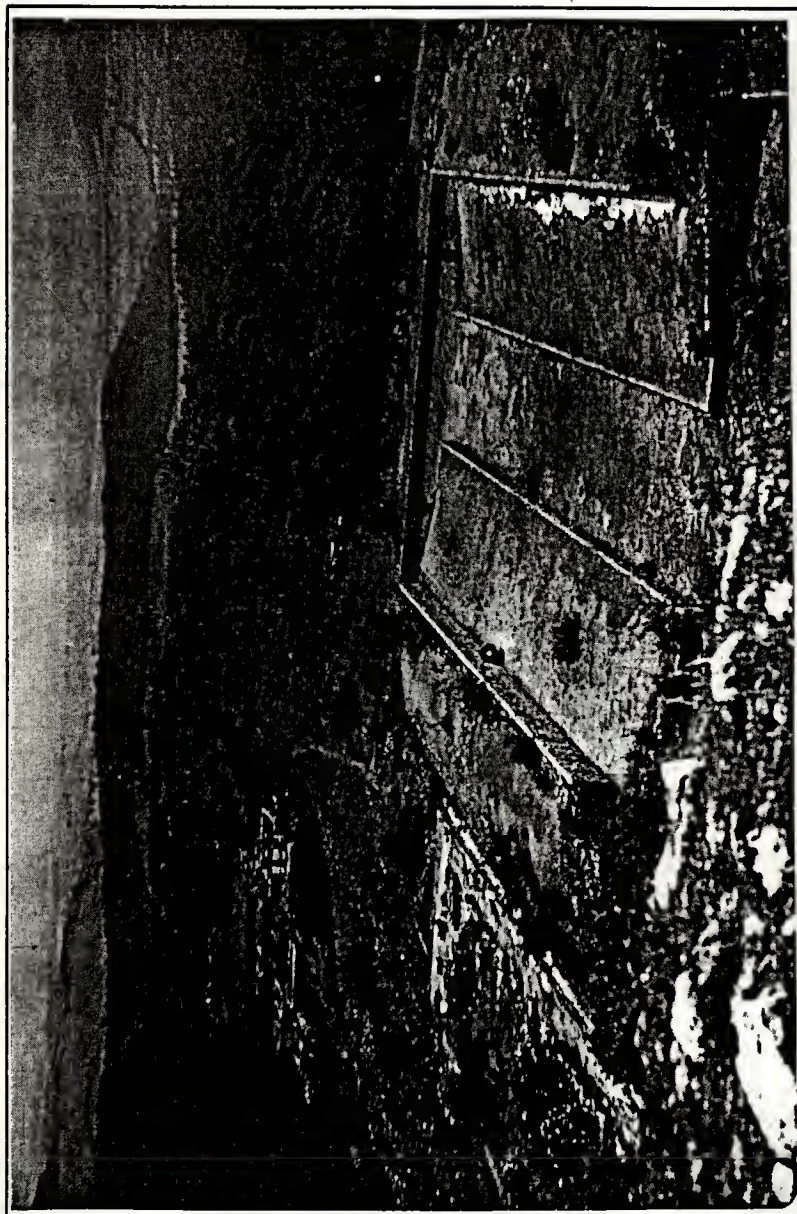
NOTICE THE
"CRESCENDO" IN THE
CAMINO SUR APPROACH ROUTE.



**MISCELLANEOUS
OBSERVATIONS**

The summit is the last, greatest, and most complete of these summaries, as it is the only place from which the total city may be viewed. These summary views render the city "imageable". Decending the hill, such overviews act as "introductions" to a phrase or sequence instead of a summary. The Camino Sur sequence is "crescendo" up and "dimenuendo" down (Ill.#102). It would appear that while most designers of Mesoamerica were involved in three dimensional design predominantly, at Xochicalco they were concerned with all four (hieght, width, depth, and time). Perhaps too much can be read into the design, but if so, it is a remarkable accident with very fortuitous results indeed. In fact other modern designers who have visited the site and written about it have also commented on this sophistication.⁵²

Let me summarize this site's aesthetic logic then as a composition dominated at its core by rectangular shapes in great variety that gradually yields to an organic order on its periphery. Line, or route, is distinct from place and is a primary form giving element in the design. Its most unique features are its overlapping terraces, and its deliberate temporal sequences. The composition appears to reapply many elements from solutions as distant as Copan with surprisingly unified results. This was no small feat on such difficult topography, and with such a long period of habitation.



"VIEW FROM THE PLAZA INFERIOR PAST THE PELOTA COURT TO LA MALINCHE" ILL. # 103

10

conclusions

Chapter 10

CONCLUSION

Looking back at the original objectives of this work I find that while I have been able to suggest an additional criterion for archeological study, it is far from proof. This is not inconsistent with the limited scope of this paper. I must go further to predict that much of this approach would be unsuitable as a "criterion" for the archeologist since it is largely unquantifiable, and the clear trend in that field is toward more and more controlled, scientific criteria. Truly some aspects of the approach, such as urban grain and texture, are only useful to the designer as crude relative measures; however, they could easily be quantified against some standard scale. With the use of such a scale, remote sensing, and computers, they could possibly achieve "criteria" status in the field of archeology. Compass orientations can be quantified, and have already been extensively explored leaving little original work to be done in this area. Empirical judgements such as those rooted in Lynch's "urban image" theory will be much less acceptable to the archeologist. In fairness, I must point out that from my limited reading on the archeologist's methodology that they tend to be very rational in their measure of proof, but are surprisingly unsystematic in the raising of the original hypothesis which they intend to test. Almost every design method, however, is really based on the systematic raising of a hypothesis against which we are forced to make pragmatic decisions in the absense of the luxury of complete proof. This continues to suggest a fruitful association between our professions. Much of the approach set forth in this work, while unsuitable as criteria, might be profitably employed in a more systematic approach to hypothesis formation in archeology.

Without a doubt one of the most interesting aspects of the research was the necessary introductory reading in archeology which was prerequisite to beginning this work. To be very use-

ful to an archeology project a designer would undoubtedly require at least some formal cross-professional training in archeology similar to that given in related design fields. Presently few, or none, consider this a possibility, and I am anxious to try it. Similarly, if the designer's empirical observations are to be of real merit, his insight will probably be proportional to his familiarity with the life style that dominated a given archeological zone. At least that is consistent with my experience developed during this project. It seemed quite similar to the designers inevitable attempt to familiarize himself with a client prior to making design decisions in his behalf.

The most useful aspect for me personally, and I hope for my colleagues who may read this work, were the numerous design lessons offered by these New World civilizations. The usefulness of a working familiarity with design history is confirmed by every university curriculum and state licensing test. Our insights are usually rooted narrowly in European experience, but could well extend to our own New World cultures of the American Southwest, Mesoamerica, and South America. In some ways, such as climate, these cultures enjoyed design forces more directly similar to our own than those of Europe. Further, this work demanded a more systematic study of historical examples than is generally utilized by designers. It, therefore, yielded more insight, and I am encouraged to apply this approach to other historic examples.

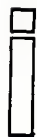
A site visit is critical to produce real insight into spatial experience. If one has a site map in hand while he walks through the a completed complex (either current or historic) a young designer can acquire a more accurate expectation of future design space than any other method with which I am familiar. Because of the time required to build a project, the relationship between the drawing and the constructed reality is slow to mature in most young designers. Conserved complexes, not just individual buildings, contain the commonwealth of knowledge of man in spatial design. Many of the plans seemed very unlikely to succeed on paper, but worked well on the site.

This suggests that more contemporary design work should be shifted from the drawing room back to the site, consistent with the practices of our predecessors.

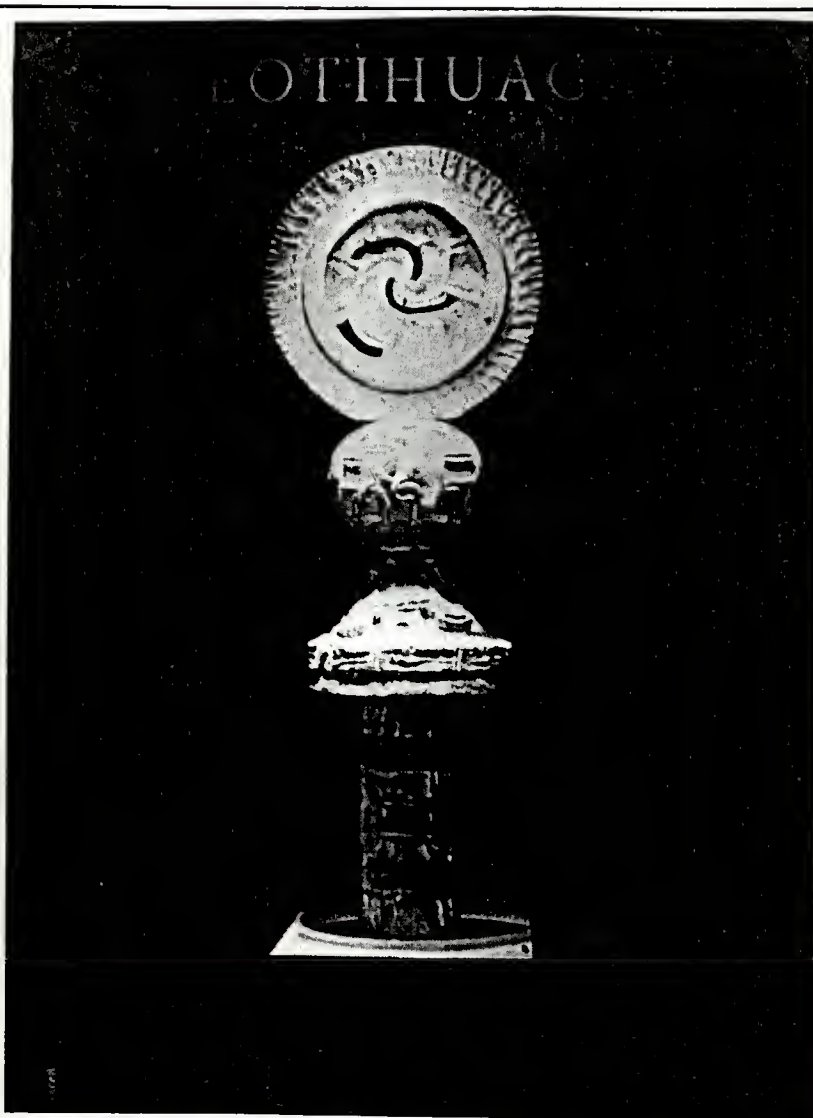


"GUATAMALAN JUNGLE NEAR TIKAL"

Ill. # 104



art

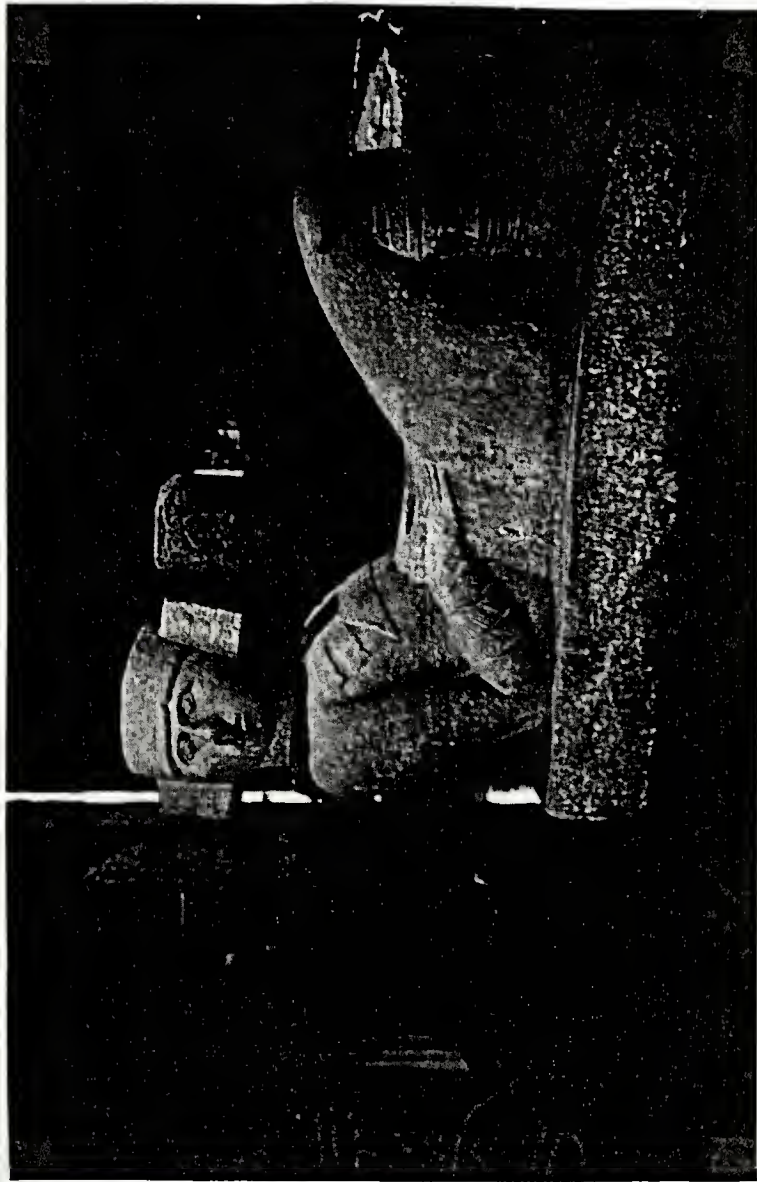


"TEOTIHUACAN, STELE FROM LA VENTILLA"
(Mexican National Museum of Anthropology)

Ill. # 105



"DETAIL FROM THE WALL OF THE TEMPLE OF QUETZALCOATL AT TEOTIHUACAN" Ill. # 106

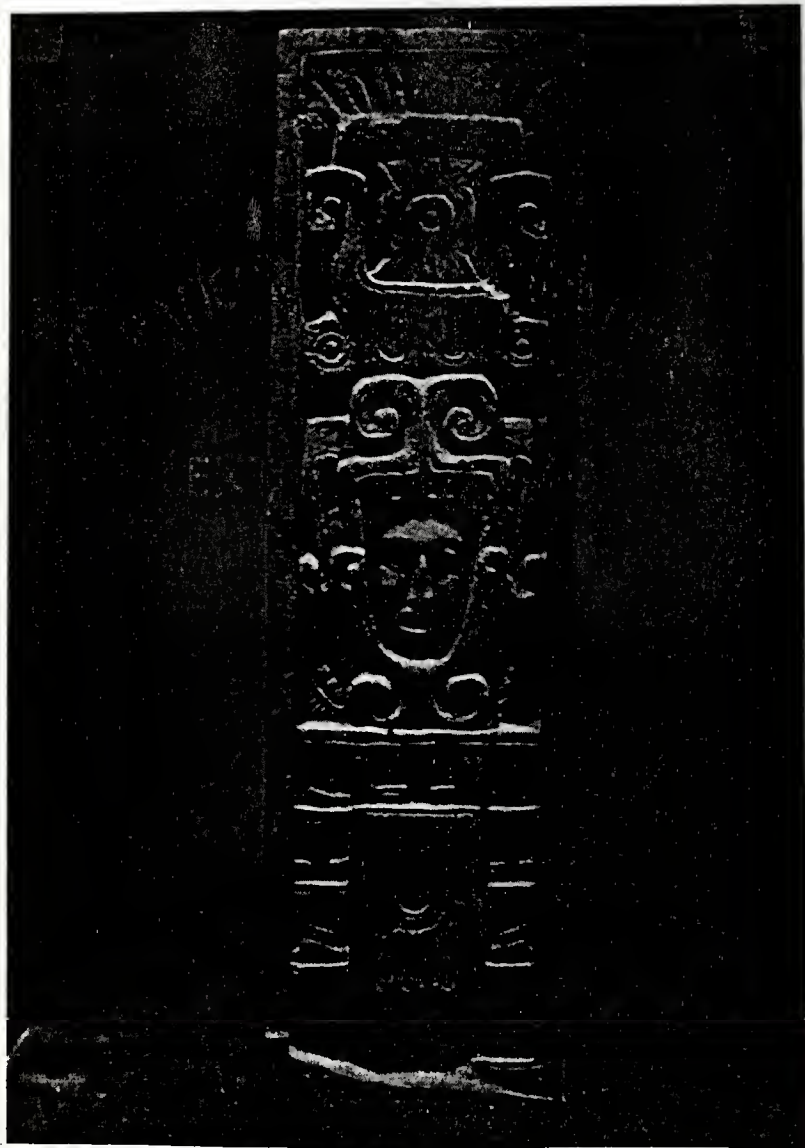


"CHAC MOOL STATUE FROM TZINTZUNTZAN"
Mexican National Museum of Anthropology

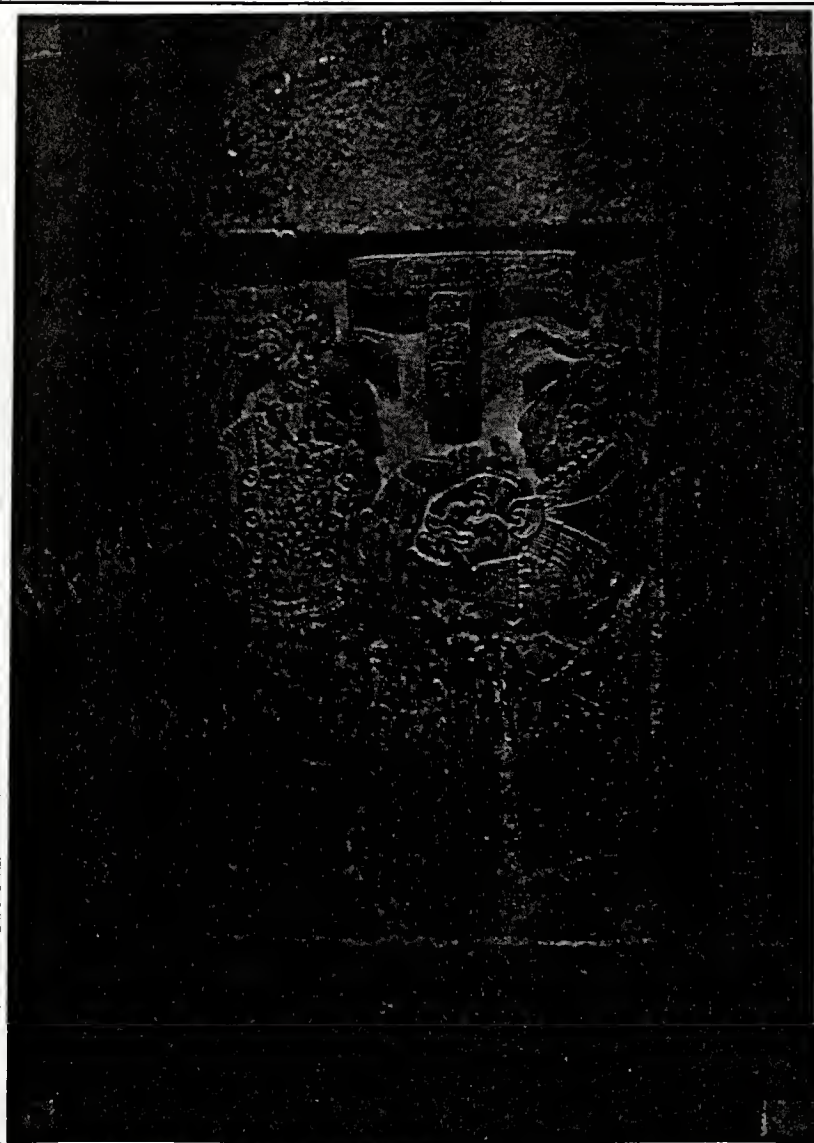


"MACAW HEAD SCULPTURE FROM XOCHICALCO"
Mexican Museum of Anthropology

Ill. # 108



"STONE STELE FROM XOCHICALCO"
Mexican National Museum of Anthropology



RELIEF CARVINGS FROM PALENQUE"
Mexican National Museum of Anthropology

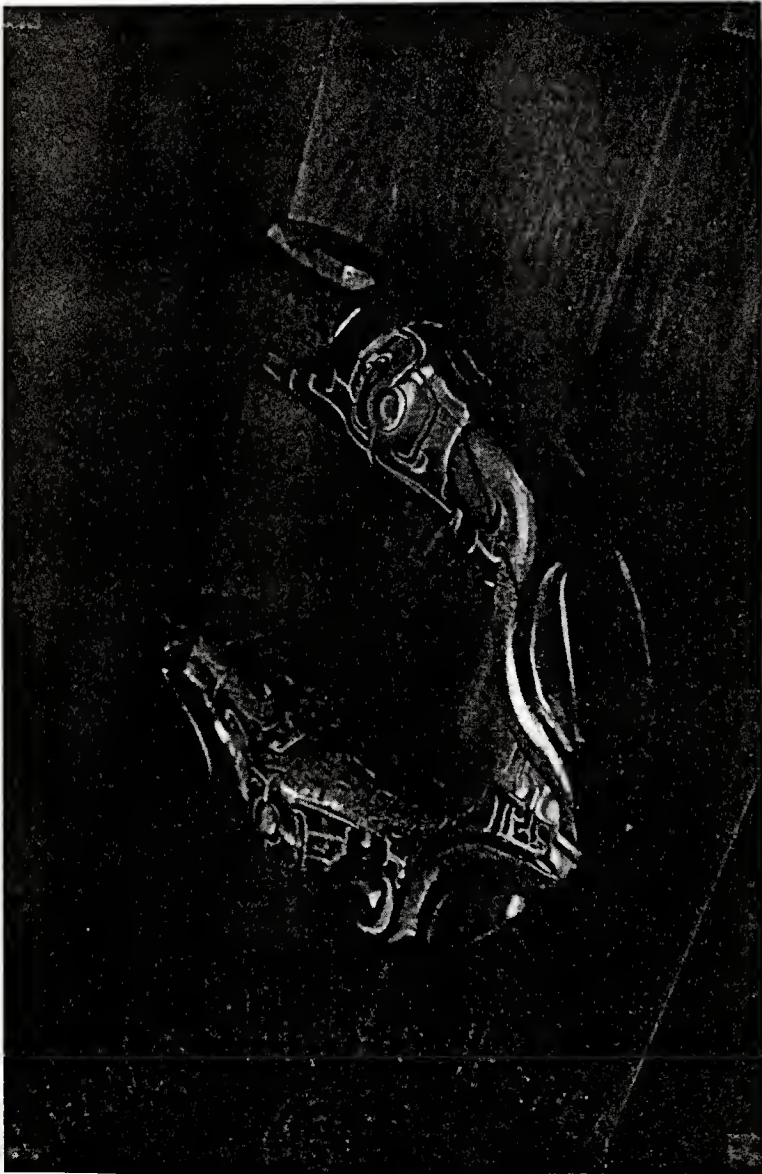
Ill. # 110



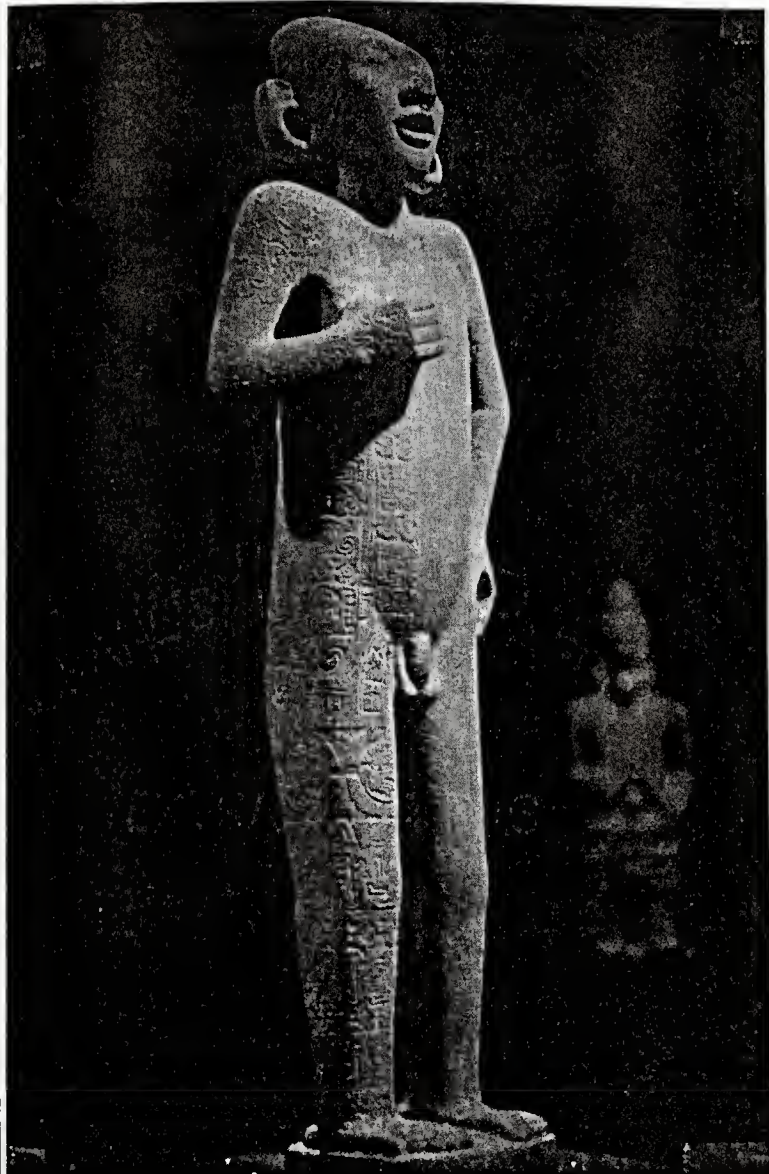
"CARVED HEAD FROM PALENQUE"

Mexican National Museum of Anthropology

Ill. # 111



"CARVED STONE YOKE FROM EL TAJIN" Mexican National Museum of Anthropology



ILL. # 113

"CARVED STONE STATUE FROM TAMUIN NEAR EL TAJIN"
Mexican National Museum of Anthropology

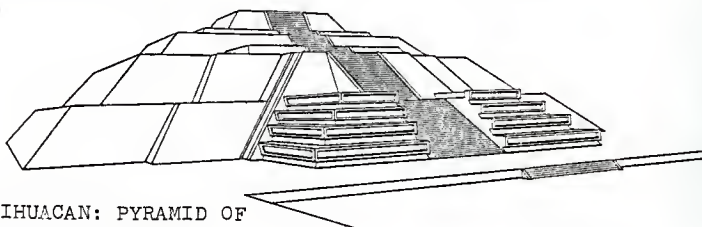


architecture

Appendix ii

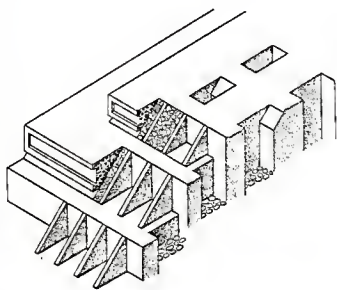
ARCHITECTURE

The following is a brief graphic overview of the architecture that characterizes the six sites selected for emphasis in this thesis, and is intended only to render the "spaces between" more understandable.



TEOTIHUACAN: PYRAMID OF
THE MOON

Ill. # 114

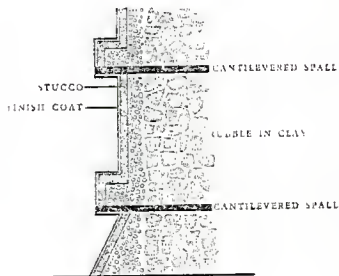


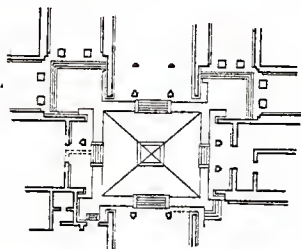
TEOTIHUACAN: TYPICAL PYRAMID
CONSTRUCTION

Ill. # 115

TEOTIHUACAN: TYPICAL TALUD-
TABLERO CONSTRUCTION

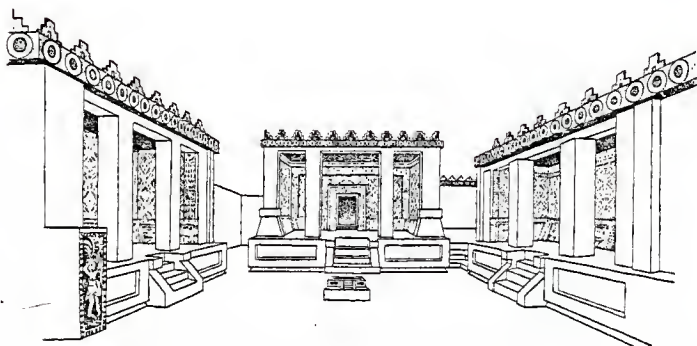
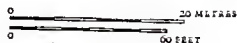
Ill. # 116





ATETELCO (Near Teotihuacan) DWELLING
GROUP PLAN

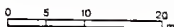
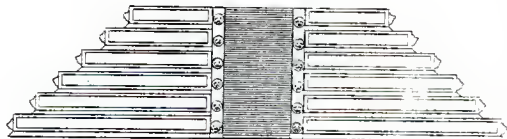
Ill. # 117

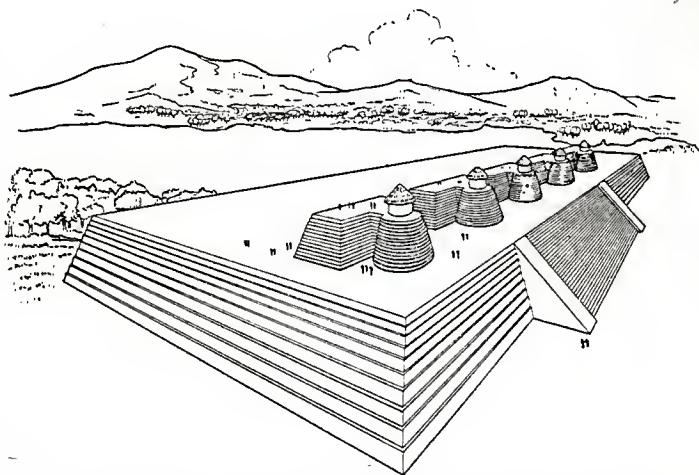


ATETELCO DWELLING GROUP PERSPECTIVE Ill. # 118

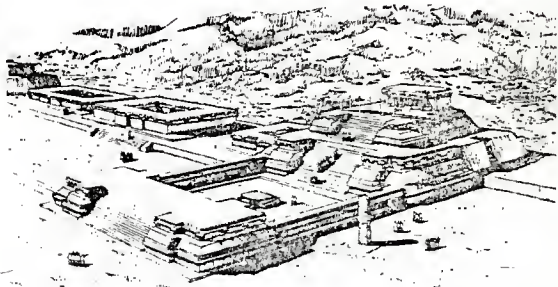
TEOTIHUACAN:
TEMPLE OF
QUETZALCOATL

Ill. # 119



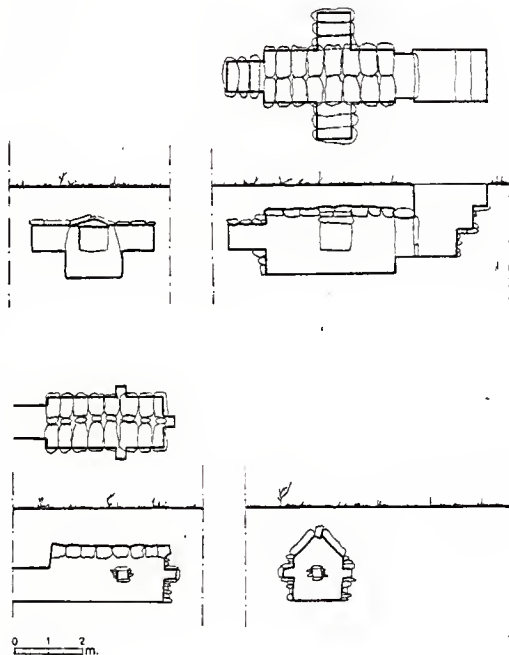


TZINTZUNTZAN: PERSPECTIVE (with Lake Patzcuaro in the background) Ill. # 120



MONTE ALBAN: RECONSTRUCTION OF COMPLEX IV

Ill. # 121

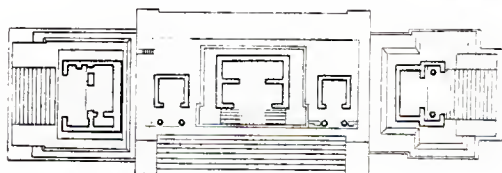


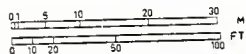
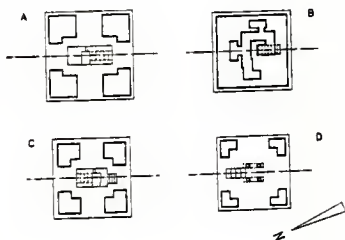
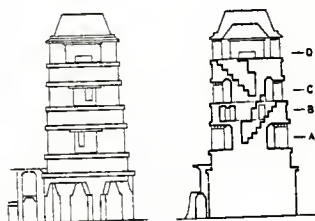
MONTE ALBAN:
TYPICAL
ZAPOTEC
TOMBS

I11. # 122

MONTE ALBAN:
BUILDINGS
"G", "H", "I"

I11. # 123



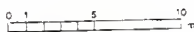
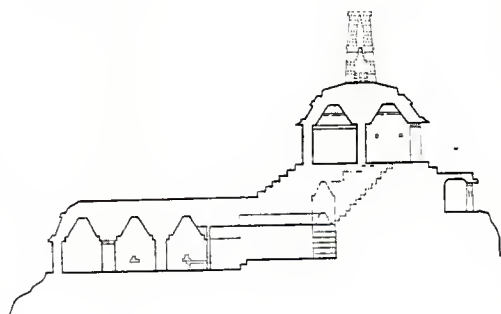


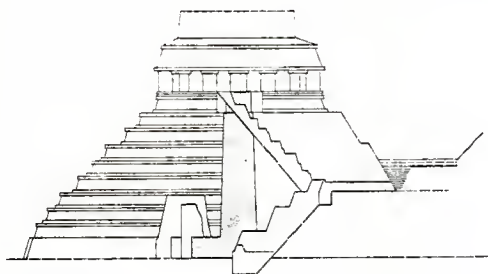
PALENQUE:
"TORRE" AT EL PALACIO

Ill. # 124

PALENQUE:
SECTION OF
HOUSE "H" OF
EL PALACIO

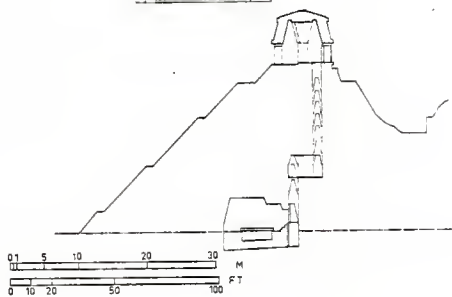
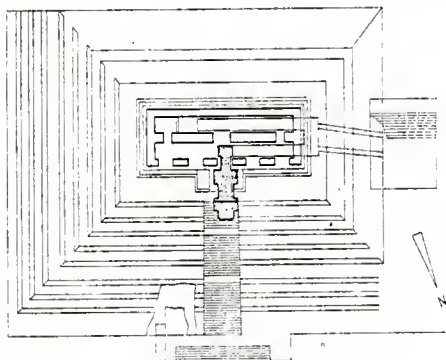
Ill. # 125





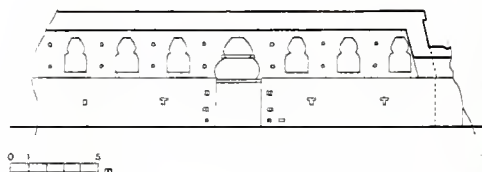
PALENQUE:
TEMPLE OF THE
INSCRIPTIONS WITH
CRYPT

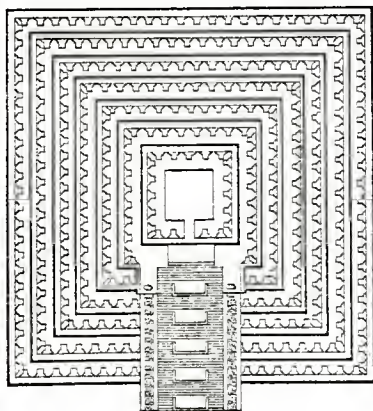
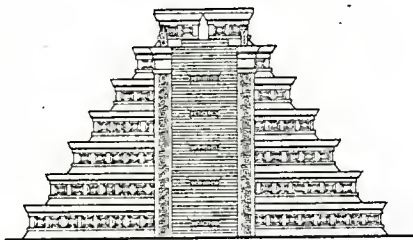
Ill. # 126



PALENQUE:
SECTION OF
HOUSE "A" OF
EL PALACIO

Ill. # 127





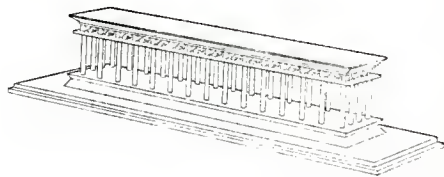
EL TAJIN:
PYRAMID OF THE
NICHES

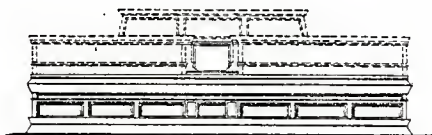
Ill. # 128



EL TAJIN:
PERSPECTIVE OF
BUILDING "Q"

Ill. # 129

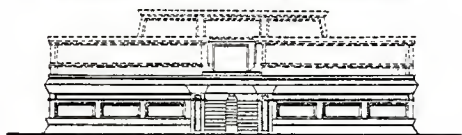
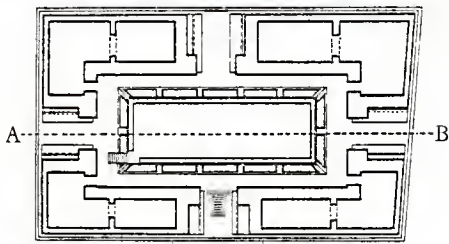




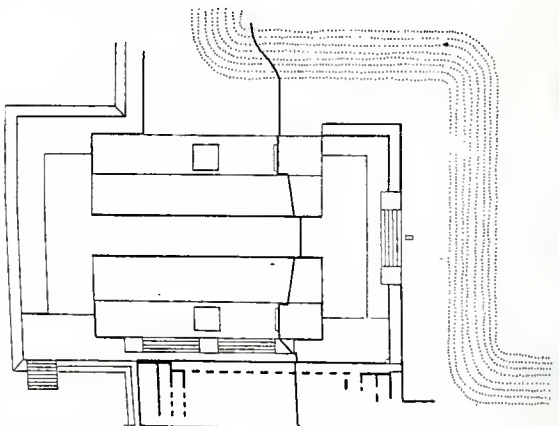
EL TAJIN:

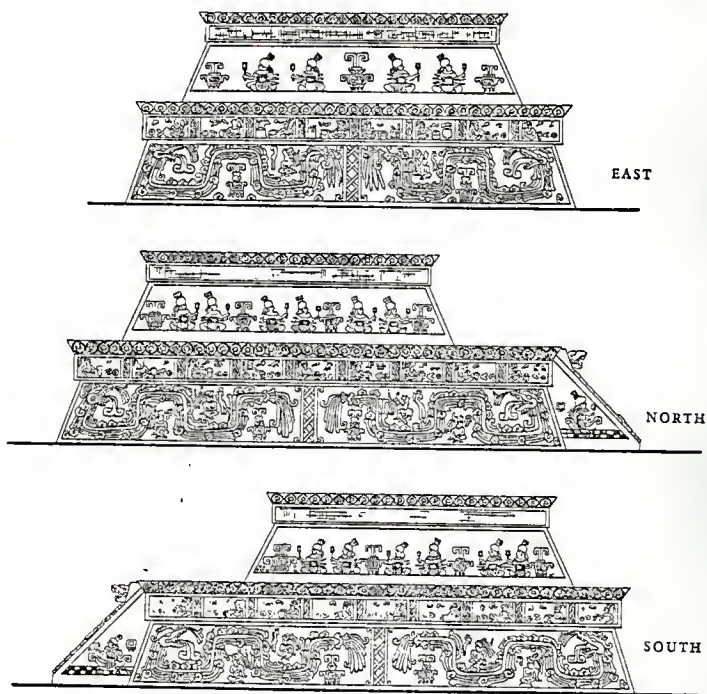
TAJIN CHICO
PLATFORM "A"

Ill. # 130

XOCHICALCO:
PELOTA COURT
PLAN

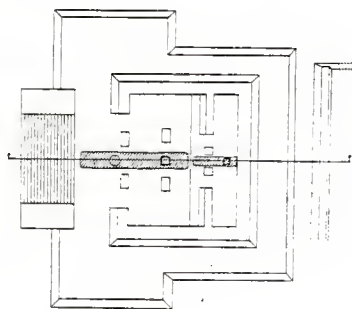
Ill. # 131





XOCHICALCO: TEMPLE OF QUETZALCOATL

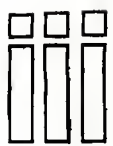
Ill. # 132



XOCHICALCO:

PLAN OF BUILDING "C"

Ill. # 133

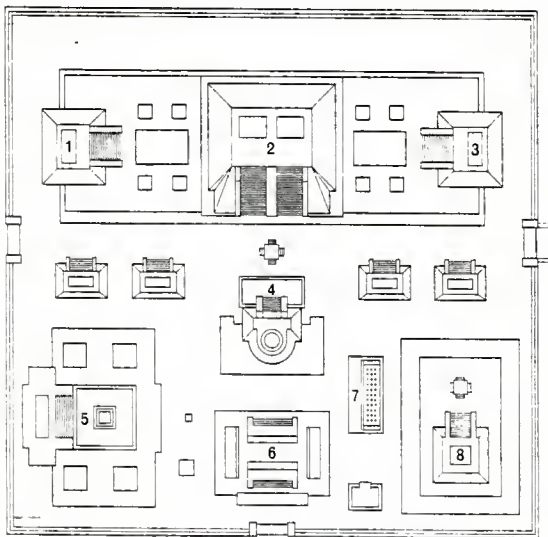


other cities

Appendix iii

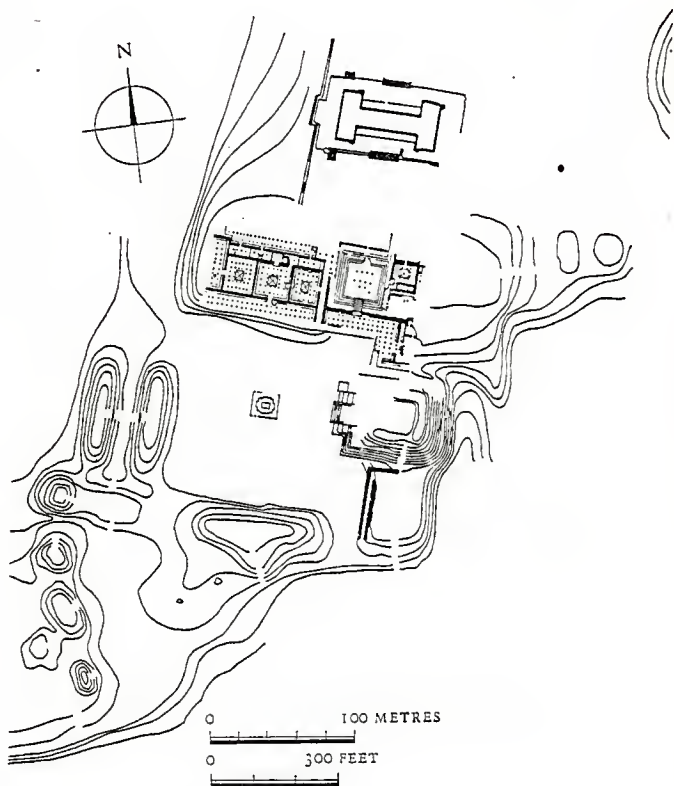
OTHER CITIES

This section provides the plans of those cities which were researched and visited, but not emphasized in this work. It also contains the plans of additional cities cited in the text for the sake of comparison.



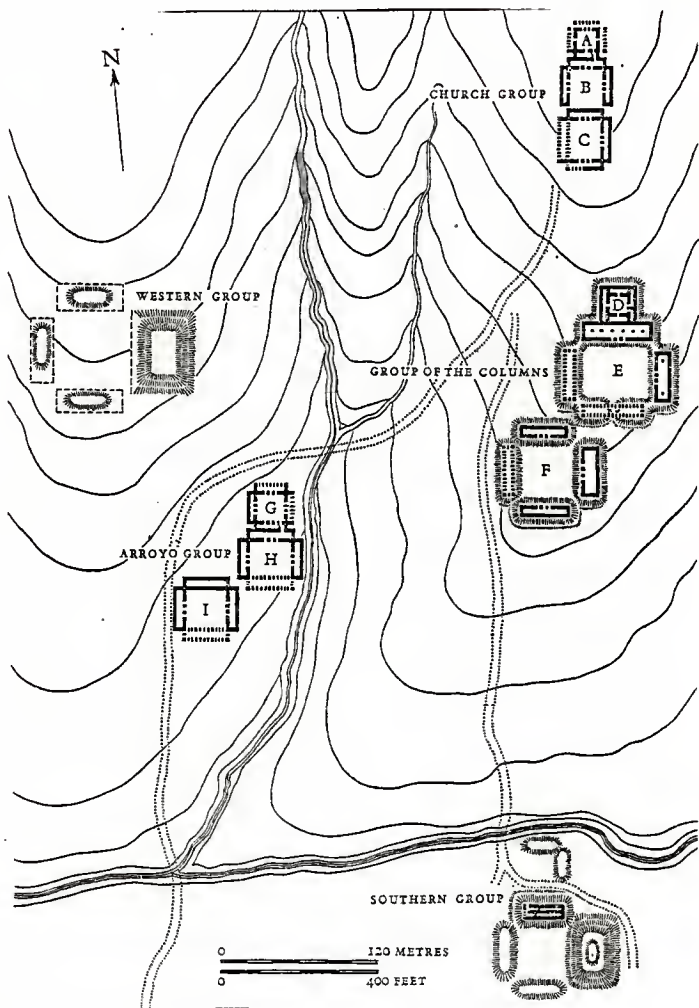
PLAN OF TENOCHTITLAN (Now largely destroyed
and covered by modern Mexico City)

Ill. # 134



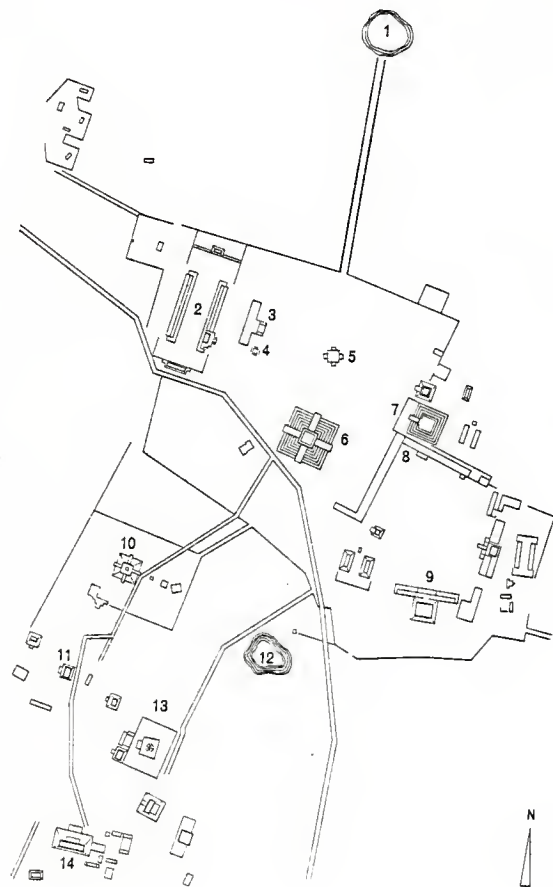
PLAN OF TULA (Capitol of the Toltec Empire)

Ill. # 135



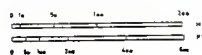
PLAN OF MITLA

I11. # 136



PLAN OF CHICHEN-ITZA, YUCATAN

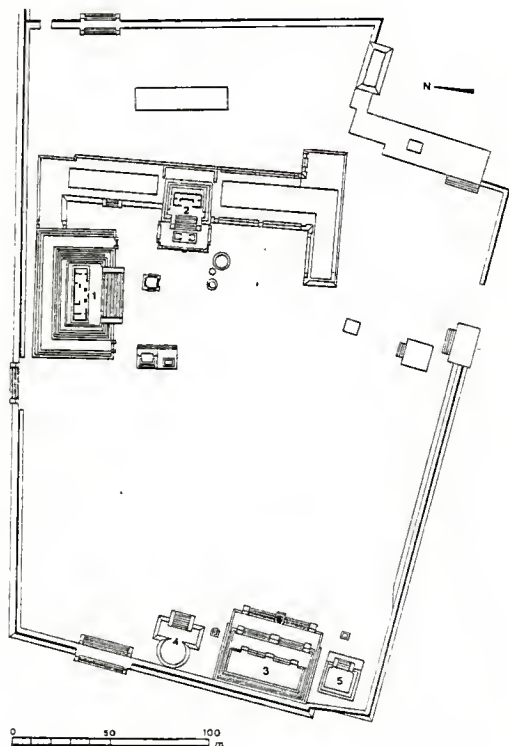
Ill. # 140





PLAN OF UXMAL

Ill. # 141



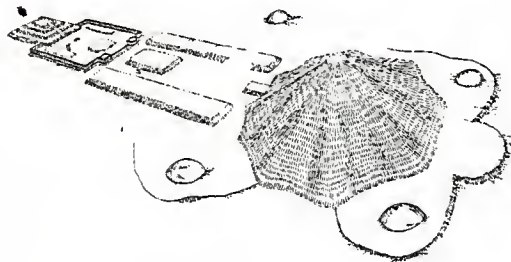
PLAN OF CEMPOALA

Ill. # 142



PLAN OF YAXCHILAN

I11. # 143



PLAN OF LA VENTA

I11. # 144

PLAN OF COPAN
HONDURAS

I11. # 145



MAIN COURT

BALL COURT

HIEROGLYPHIC
STAIRWAY

STRUCTURE 22

G L O S S A R Y

Aesthetics: perceivable, understandable.

Beauty: I like it.

Chacmool: a reclining god (statue) usually associated with the Toltec culture.

Codex: a pictographic history.

Crescendo: (from music) a gradual increase in intensity.

Diminuendo: (from music) a gradual decrease in intensity.

Glyph: each pebble-shaped unit in Mayan writing.

Grain: each individual particle from which a texture is made.

Hue: that aspect of color caused by wave frequency which leads to its name (e.g. red, blue).

Image: mental conception resulting from the perception of sensory data.

Intensity: (in color) purity or saturation.

Interval: (in rhythm) the space or time separating recurring elements within a pattern.

Line: the path of a moving point.

Mass: bulk or quantity of matter in an object.

Milpa: the agricultural practice of cutting and burning the vegetative land cover from an area prior to planting crops.

Modulation: (of space) variation in both the volume and proportions of spaces.

Phrase: (from music) a short, distinct part of a longer passage or movement.

Plane: a flat, or two-dimensional, surface.

Point: a position; (or focal point) the position of greatest sensory attraction or interest.

Proportion: the meaningful relationship of an objects parts to the whole, whole to its parts, and parts to each other.

Rhythm: flow of events with a recognizable, regular recurrence of elements within it.

Scale: a comparison to a preconceived measure (e.g. the "human scale" meaning a comparison to human body sizes).

Talud-Tablero: alternately sloped and vertical wall surfaces particularly common in Teotihuacan construction.

Texture: apparent, or tactile roughness of a surface due to the variation of the grain sizes from which the surface is made.

Voladores: the "Dance of the Fliers"; a Huastec performance requiring men to be suspended from a tall pole.

Yacata: a type of pyramid found at Tzintzuntzan.

F O O T N O T E S

¹Robert Boulanger, trans., Mexico, Hachette World Guide Series, by J. S. Hardman (Paris: Hachette Pub., 1969) pp. 90-93.

²Boulanger, pp. 93-95.

³Shirley Gorenstein, Richard Forbis, Paul Tolstoy, and Edward P. Lanning, Prehistoric America (New York: St. Martins Press, 1974) pp. 50-57.

⁴Robert E. Quirk, Mexico (Englewood Cliffs, N.J.: Prentice Hall Inc., 1971) pp. 5-21.

⁵Boulanger, pp. 107-122.

⁶Roman Pina-Chan, A Guide to Mexican Archeology (Mexico City: Minutiae Mexicana, 1971) pp. 20-25.

⁷Pina-Chan, pp. 108-114.

⁸Ignacio Bernal, The Mexican National Museum of Anthropology (London: Thames and Hudson Pub. Co., 1970) pp. 159-164.

⁹George Kubler, The Art and Architecture of Ancient Mexico (Baltimore: Penquin Books Ltd., 1962) pp. 87-88.

¹⁰Pina-Chan, pp. 82-88.

¹¹Pina-Chan, pp. 104-108.

¹²Frederick Peterson, Ancient Mexico (New York: Capricorn Books, 1962) pp. 80-84.

¹³Boulanger, pp. 95-97.

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¹⁵Peterson, pp. 85-104.

¹⁶Kevin Lynch, Image of the City (Cambridge, Mass.: M.I.T. Press, 1975) pp. 46-82.

¹⁷Christian Norberg-Schultz, Existence, Space, and Architecture (New York: Praeger Pub., 1971) pp. 17-36.

¹⁸Gordon Cullen, Townscape (New York: Van Nostrand Reinhold Co., 1961) pp. 128, 155.

¹⁹Robert Sommer, Personal Space (Englewood Cliffs, N.J.: Prentice-Hall Inc., 1969) pp. 26-57.

²⁰Camillio Sitte, trans., City Planning According to Artistic Principles by George and Christian Collins (New York: Random House Inc., 1965) pp. 24, 32-46.

²¹Edmond Bacon, Design of Cities (New York: Penquin Books, 1974) pp. 64-71.

²²John Ormsbee Simonds, Landscape Architecture (New York: McGraw Hill Book Co., 1961) p. 158.

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²⁴Cliff Tandy, "Site Investigation and Appraisal", Architects Journal, November 1970, pp. 1277-1279.

²⁵Heinrich Engle, The Japanese House (Rutland, Vermont: Charles E. Tuttle Co. Pub., 1964) pp. 419-422.

²⁶Adrian Garcia Valades, Teotihuacan, Its Cities and Its Monuments 2nd Ed. (Mexico City: Distribucion Cultural Especializada, 1976) pp. 1-16.

²⁷Valades, pp. 17-45.

²⁸Valades, pp. 7-15.

²⁹Edward Hall, The Hidden Dimension (Garden City, N.Y.: Doubleday and Co. Inc., 1966) pp. 113-129.

³⁰Jorge E. Hardoy, Pre-Columbian Cities (New York: Walker and Co., 1973) p. 70.

³¹Boulanger, pp. 626-628.

³²Ibid.

³³Ibid.

³⁴Ibid.

³⁵Bernal, pp. 162-164.

³⁶Kubler, pp. 90-94.

³⁷Hardoy, pp. 104-113.

³⁸Boulanger, pp. 832-834.

³⁹Ibid.

⁴⁰Boulanger, pp. 834-842.

⁴¹Hardoy, pp. 99-104.

⁴²Boulanger, pp. 712-717.

⁴³Boulanger, pp. 711-712.

⁴⁴Bernal, pp. 109, 111-112.

⁴⁵Boulanger, p. 712.

⁴⁶Hardoy, pp. 100-103.

⁴⁷Bacon, pp. 64-71.

⁴⁸Marshall H. Saville, Bibliographic Notes on Xochicalco
Mexico (New York: Museum of the American Indian, 1928) pp. 1-4.

⁴⁹Boulanger, pp. 665-668.

⁵⁰Boulanger, pp. 664-665.

⁵¹Peterson, p. 56.

⁵²Bernal, pp. 62-65.

⁵³Hardoy, pp. 89-99.

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SPATIAL LOGIC IN
PRE-HISPANIC MESOAMERICA

by

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AN ABSTRACT OF A MASTER'S THESIS

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FOCUS

This work is centered on the gap between the professions of archeology and landscape architecture, and is directed toward the two-way flow of information across that gap.

CONTEXT

The literary research required prior to beginning this work revealed that some important information is already flowing across this space. The University of Pennsylvania and others have investigated the impact of ecology on the design of many important Mesoamerican cities. Several extensive books on the architecture of Mesoamerica have been completed. This greatly narrowed the scope of inquiry in which original work could be completed; however, some important potentials were still available. One additional problem which persisted throughout the work was the lack of complete, and reliable basic site data which is common in this country, but uncommon in a foreign context.

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OBJECTIVES

In addition to furthering the commonwealth of knowledge in landscape architecture, particularly in the historic lessons in spatial design offered by Pre-Columbian Mesoamerica, the following goals were pursued:

1. To suggest that spatial distribution might be used as an archeological criteria in the way pottery and architecture are utilized.
2. To begin to educate myself in the techniques, knowledge, and vocabulary of the archeologist.
3. To begin to educate myself in one archeological zone (Mesoamerica).
4. To begin to introduce the archeologist to some of the theories and practices of contemporary spatial designers.

METHOD

Briefly, a broad sampling of Mesoamerican archeological sites were analyzed using the techniques of contemporary landscape architects. This provided a basis for comparison.

One site (Xochicalco) was then examined for spatial characteristics that it might share with the earlier sampling.

ACTIONS

Space can be only partially examined by using maps and documents. For this reason site visits, notes, and site photographs were required after the completion of the literary search (which encompassed design theory, archeology, and the culture of Mesoamerica).

RESULTS

In addition to the actual thesis, this effort also yielded a substantial data base on Mesoamerica and a large body of slides which are currently in use in the teaching of history. Xochicalco was found to be a site of remarkable sophistication in its spatial design, particularly in the sequencing of visual events along its major routes. Furthermore, the city was found to share common characteristics with both Mayan and Altiplano spatial designs."